SONY

High Definition Video System

Digital HDVS



Sony Multiformat Camera System

HDC-900/950/930 Series Product Information Manual



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1 Introduction

1-1. Overview

The HDC-900/950/930 family is designed to provide a wide range of choices of HDTV and SDTV configurations to fulfill the increasing demands for multiple global digital origination formats from almost all applications including broadcasters, filmmakers, production companies, etc. The HDC-900 Series consists of HDC-900 full size studio model color video camera and the HDC-950/930, its flawless companion portable version. Both of them were developed for both studio and outside application systems, based on several newly developed technologies applied to each key component such as pickup device, camera head, camera control unit, and so forth.

One of the major design criteria was to easily integrate the most popular Sony digital camera control systems in order to enable the field-proven Sony camera control system and its familiar menu control systems to be used with the HDC-900/950/930, resulting in quick and reliable installation and a wide choice of camera systems implementations - from a single stand-alone camera to a sophisticated Multi-camera installation.

1-2. Advanced Digital Signal Processing (ADSP)

Easy-to-setup and highly reliable

Digital processing performs parameters in a digital memory and keeps them intact for long periods of time, resulting in a dramatic reduction of the need for operator adjustment.

With the use of digital processing, further advantages are achieved, such as to easy implementation of this circuitry in ICs and LSIs while increasing reliability.

Precise adjustment

The values of the camera set-up parameters can be defined with great precision by digital processing. Moreover, variations between cameras, which are very difficult to avoid in analog models, can be reduced to a minimum with digital processing by simply equalizing parameter values.

Flexible signal processing and parameter settings

A significant advantage of digital processing is that it can provide very flexible operation. Many camera parameters can be controlled and each parameter setting can be varied over a wide range of values.

1-3. Sony Design Criteria

There are several important design criteria Sony has taken very seriously in the HDC-900 Series to ensure that it not only provides the features required for these new services, but also has compatibility with existing broadcast environments, and further enhances DSP (Digital Signal Processing) technology.

- True multi-standard operation from 1080/24P to analog composite (NTSC/PAL).
- The HDC-900 Series must provide higher picture quality than any conventional digital cameras. Operationally, it must be compatible with current Sony color video cameras.
- Digital system architecture should be consistent with current 12-bit digital cameras and the previous models as well so that all types can be mixed together without picture matching difficulties.
- To take full advantage of 12-bit digitization, as many camera processes as possible should be digital, particularly gamma, detail and so on.
- Operational controls and connectors are located in similar positions to those on current Sony HDC and BVP Series cameras, so operators accustomed to these models immediately find the HDC-900 Series familiar and easy to use.
- Existing Sony MSUs, CNUs and RCPs can be used with the HDC-900 Series. Current menu control systems and auto set-up functions are also compatible.
- Capital cost must not be significantly greater than Sony standard definition camera equipment.

1-4. Features of the HDC-900/950/930

Exclusive HAD sensor technology

A new design of CCD has been developed for the HDC-900, HDC-950, and HDC-930. Based on Sony HAD sensor technology and using the on-chip lens structure of the latest Power HAD™ sensors, this CCD is based on the 1920 × 1080 CIF (Common Image Format) and is switchable between progressive mode and interlace mode readout (except HDC-930 which is only available at 1080/60i and 1080/50i without progressive mode). With its light collecting capability dramatically improved, this 2/3-inch type 2.2 million-pixel FIT CCD used in the HDC-900/950 offers an industry-leading sensitivity of f10 at 2,000 lux. It has a limiting horizontal resolution of 1000 TVL/ph, a signal-to-noise ratio of 54 dB (unweighted over 30 MHz) and the outstandingly low vertical smear level of -135 dB*.

The cost effective 2/3- inch type 2.2 million-pixel IT CCD used in the HDC-930 provides equivalent performance as the FIT version CCD excluding the vertical smear level which is provided at -125 dB*

** typical numbers.*

12-bit A/D conversion and ADSP (Advanced Digital Signal Processing)

The combination of 12-bit A/D conversion and the new 2.2- million sensor CCD provides excellent color rendition and overall picture quality.

The powerful ADSP circuitry enables camera set-up parameters to be adjusted over a wide range. Menus are used to select the required parameters, such as gain, gamma, flare, pedestal and detail, and with adjustments made from a central Master Set-up Unit

(MSU) parameter settings can be transferred to other cameras in a system for perfect picture matching.

Ergonomic Body Design

For over two decades, Sony has been designing and manufacturing broadcast video cameras and camcorders. In creating these designs, great importance has always been given to achieving control layouts based on the practical, operational requirements of the user. The control layout of the HDC-900 therefore naturally follows that of other HDC and BVP Series cameras. For example, the V/F adjustment and controls for the intercom system, V/F return selection, lens filter selection, etc. are all located in similar positions to previous models, so that operators with experience of Sony cameras can operate this new model intuitively.

The HDC-950/930 portable model features a body that is so compact and lightweight that it opens up new and exciting possibilities in location camera work. Newly developed ADSP LSIs drastically reduces its power consumption, which helps contribute to the stable operation of the entire system. This design with a low optical axis and superb weight distribution means that the camera can be carried comfortably on the shoulder without causing fatigue. Tripod operation is just as easy, and the HDC-950/930 has all its controls and connectors located in similar positions to those on Sony BVP cameras. Even with a viewfinder, microphone and a standard ENG lens, the total weight of the HDC-950/930 is only around 7 kg (about 16 pounds).

Optical Filter Wheels

Independent ND and CC optical filters are provided on both the HDC-900 and HDC-950/930. The filter drives provided for both 900 and 950/930 are exactly the same, so that common operation is enabled between the hard camera and the portable type when the filter settings are adjusted remotely on a RCP, MSU or RM-B750/B150 Remote Control Unit.

Electronic Shutter

The electronically operated shutter provides speeds of 1/100, 1/250, 1/500/, 1/1,000, and 1/2,000 of a second (1080/60i mode).

Clear Scan and ECS (Extended Clear Scan)

Sony's Clear Scan and ECS* functions eliminate banding effects when shooting monitor displays by allowing the shutter speed to be adjusted so that it exactly matches the various scanning frequencies that are in use. The clear scan shutter speed range is 60.1 to 4300 Hz (1080/60i mode). The ECS function is especially effective under the frequency of 60 Hz or 50 Hz.

** The ECS function is available with the HDC-900 and HDC-950*

Super EVS

Super EVS (Enhanced Vertical-definition System) raises vertical picture resolution, while minimizing line flicker*. It is ideal for shooting of a stationary subject or still images - the method used for the "Claymation" process, for instance.

** The Super EVS functions when operated at Interlace mode.*

Standard 2/3-inch type Lens Mount

Either an HD lens or a standard definition 2/3-inch type format lens can be mounted. This allows standard lenses that are in everyday use with Sony cameras and camcorders to be used with the HDC-900 and HDC-950/930.

Memory Stick™ Media Card

Sony **Memory Stick™ media card** technology provides a new function on both the HDC-900 and HDC-950/930. Camera operators can store their personal preferences for a number of camera set-up parameters and V/F indicators in a personal Memory Stick media card. Whenever one of these memory devices is inserted into its slot on a HDC-900/950/930 camera, the operators particular settings are instantly recalled. All the data stored in one or more Memory Stickmedia cards also can be registered and stored in a standard PC, so that each set of preferences can then be used to initialize individual or groups of cameras.

Multi Matrix

This function enables a particular color in a scene to be selected and its hue and saturation changed.

Adaptive Highlight Control (Auto Knee mode)

The Sony ADSP system intelligently monitors the brightness of all areas of the picture and automatically adapts the knee point/slope for optimum reproduction at that particular scene location within the picture. A typical example is shooting an interior scene which includes a sunlit exterior seen through a window.

Three-channel Skin Tone Detail Correction

The Skin Tone Detail Correction controls the detail level of those objects in a scene with specific color tones. The HDC-900/950/930 allows detail to be set independently for each of three separate color ranges. These colors are not limited to skin tones, but can be set for any color. Detail may be increased or decreased relative to the normal level.

Knee Saturation Function

This function works similar to - Sony's TruEye™ processor which is one of the most innovative features that Sony ADSP allows. This function - makes it possible to reproduce very natural colors of high contrast scene content. When knee correction is individually applied to the RGB channels, it can lead to color distortion in highlight areas, for example skin tones can tend to look yellow. Knee Saturation processing automatically retains accurate color in these highlight areas to maintain the saturation in those picture areas compressed by the Knee function.

Low-key Saturation

The Knee Saturation function is also effective for low-key pictures, maintaining saturation to give color reproduction characteristics.

Selectable Gamma and Initial Gain

Several Pre-set Gamma curves and Initial Gain settings are provided to emulate standardized video gamma transfer characteristics. These gamma tables are always accessible and interchangeable via the camera set-up menu.

Variable Black Gamma Range

The Variable Black Gamma Range function helps to precisely control shadow areas. It can help to bring out details from the dark areas of the picture without affecting mid-tones and keeping the absolute black level unchanged. 12-bit A/D and the low noise CCD have extended the prowess of this important subjective picture control.

Black Stretch

Limits the Black Gamma function to picture luminance.

Level Dependent Detail

This function provides natural detail enhancement on extreme highlights by automatically limiting the amplitude of edge signals when they occur in high contrast signals.

1-5. Features of the System Components

MSU-700A and MSU-750, Master Set-up Units

These MSUs provide a centralized technical control position in a multi-camera system.

The MSU-700A is designed for use mounted with its control panel horizontal while the MSU-750 is designed for mounting vertically. They have been designed to allow comprehensive, wide ranging, technical supervision and alignment of a complex camera system from a single centralized panel. If it is desirable to extend this supervision to more than one control location (for example separate operational and engineering/maintenance control centers) then a number of MSU panels can form part of a large camera system. The MSU-700A and the MSU-750 are designed to work in conjunction with the Command Network Units CNU-700 and CNU-500. However, in a single-camera system, these MSUs can operate alone. They provide rapid, finger-tip access to all controls relating to the smooth functioning of an operational system, including:

- Technical alignment controls for the entire camera chain
- Picture and waveform monitor switching
- System configuration
- Control data filing
- Precise picture adjustment

Some of the important control functions that can be made from these MSUs are described below.

HKC-T950, HD CCD Block Adaptor

The new HKC-T950 HD CCD Block Adaptor, which is a unique accessory of HDC-950 and HDC-930 portable cameras, allows the CCD block to be extended from the camera body by up to 10 m (up to 50 m with an optional cable). Therefore, more creative camera shooting such as in space limited or awkward environments is possible, thus expanding HD camera applications. The viewfinder can be detached from the CCD block depending on the environment of the application. The HKCT950 can also be mounted on a front or bottom of Helicopter (e.g. using Wescam products) or a mini-crane.

HDCU-900/950, Camera Control Units

Two camera control units are available for use with the HDC-900/950: the full size HDCU-900 and half rack HDCU-950. The HDCU-900 has been designed to support both the HDC-900 Studio Camera and HDC-950 Portable Camera in fixed environments for maximum expandability, flexibility, and full controllability. The compact HDCU-950 CCU is intended for mobile use but provides controllability almost equivalent to the HDCU-900. As standard, the HDCU-900 has four sets of HD SDI SMPTE 292M signal outputs and V/F return inputs, plus four sets of digitally down-converted SDI SMPTE 259M outputs and four digitally up-converted V/F return inputs.The HDCU-950 has three sets of input/output interfaces for HD SDI SMPTE 292M signal outputs and V/F return inputs, and digitally down-converted SDI SMPTE 259M outputs and up-converted V/F return inputs.

A variety of optional interface expansion boards are available for both units. The HKCU-901, HKCU-902, HKCU-903 and HKCU-904 are for use with the HDCU-900, and the HKCU-

951 and HKCU-953 are for the HDCU-950. As for the HDCU-900, the HKCU-901 SD Encoder Boards provide analog NTSC and PAL VBS signal outputs and V/F return inputs, and analog component output. The HKCU-902 HD Analog Interface Board enables HD Analog output and input (as defined by SMPTE 240M). Furthermore, the HKCU-903 Frame Converter Boards provide 2:3 pull-down to change the picture format between 24P and progressive 30 frames. And lastly, the HKCU-904 Line Converter Board has the capability to convert 1080-line pictures into 720-line pictures, and provides four sets of HD-SDI outputs and V/F return inputs. The HKCU-951 and HKCU-953 used with the portable HDCU-950 CCU provide equivalent functions to the above HKCU-901 and HKCU-903.

High Definition Origination

HD Production Format	1080/60i	1080/50i	1080/30P	1080/25P	1080/24P	720/60P (HDCU-900 only)	
Camera Head Capture Format	1080/60i	1080/50i	1080/30P	1080/25P	1080/24P	1080/60i	540/60P
HDCU-900/950 Output Format							
HD-SDI (Reserved slot)	1080/60i	1080/50i**	1080/30P**	1080/25P**	1080/24P**	1080/60i	540/60P
Down-converted SDI (Removable slot)	480/60i**	576/50i**	480/30P**	576/25P**	480/60i**	480/60i	480/60i
HKCU-903/953 Frame Converter (Optional)	No	No	No	No	1080/60i**	No	No
HKCU-904 Line Converter (Optional)	No	No	No	No	No	720/60P**	720/60P
HKCU-901/951 SD Encoder (Optional)	NTSC**	PAL**	NTSC*	PAL*	No	No	No

** Monitoring quality only.*
*** Entries printed in blue are recommended choices.*
**** HDC-930 only supports interlace formats and 1080/60i or 1080/50i.*

Standard Definition Origination

Production Format	480/60i	480/30P	576/50i
Camera Head Capture Format	1080/ 60i	1080/ 30P	1080/ 50i
HDCU-900/950 Output Format			
HD-SDI (Reserved slot)	1080/ 60i**	1080/ 30P**	1080/ 50i**
Down-converted SDI (Removable slot)	480/ 60i**	480/ 30P**	576/ 50i**
HKCU-903/953 Frame Converter (Optional)			
HKCU-904 Line Converter (Optional)			
HKCU-901/951 SD Encoder (Optional)	NTSC**	NTSC*	PAL**

** Monitoring quality only.*
*** Entries printed in blue are recommended choices.*
**** HDC-930 only supports interlace formats.*

Optical Fiber Digital Transmission

The cable connecting the HDCU-900/950 CCU to an HDC- 900 or HDC-950/930 camera uses two single-mode optical fiber lines, two control lines, and two power lines to carry digitized video, audio, control signals and power to the camera. An extremely high-quality, all-digital bi-directional video and audio signal can be transmitted up to a distance of 3 km (1.86 miles)* with the HDCU-900 and up to 1.2 km (0.75 miles)* with the HDCU-950. This cable and connector conforms to the SMPTE standard.

** When supplying power to the camera via the optical fiber cable, the maximum cable length varies with the camera system configuration and lens type, the size of the optical fiber cable and the number of cable connectors.*

Safety Oriented Power Supply

As safety is a major design concept of every Sony design, the HDCU-900/950 continuously checks the camera cable for open or short circuits. An alarm is given if a fault is found and some appropriate precautionary actions taken, case by case.

An additional safety feature is that a low voltage is initially supplied from the HDCU-900 optical fiber connector when the unit is switched on. Only when the system check has verified that an appropriate camera is connected is the normal operating voltage output.

Locking to External Reference Signals

The HDCU-900/950 can be locked to an external reference signal. Either a HD tri-level sync signal (according to SMPTE 240M), or an SD black burst signal can be used as the reference signal.

RCP-750/751, Remote Control Panels

Two types of RCP-750 Series Remote Control Panels are also available, providing a range of control functions from the basic to very sophisticated for operational adjustments of an HDC-900/950/930. Each type is available with either a joystick or dial type iris control.

RM-B750, Remote Control Unit

The RM-B750 Remote Control Unit has been designed to establish a highly mobile and fully controllable camera system in the field by integrating control capability equivalent to a Master Set-up Unit into a compact unit powered from the device to be controlled.

The RM-B750 can be connected directly to the any HDC- 900 Series camera, attached to the half-rack HDCU-950 Camera Control Unit or connected to an HDW-250 portable VTR used with these components. The combination of an LCD touch-panel screen and direct push buttons enables full parameter adjustment of the camera to be controlled. When necessary, basic tape transport functions of a portable VTR can be controlled*. For further operational convenience, the RM-B750 has a Memory Stick® media card slot so that various setup parameters can be stored and transferred between camcorders.

** VTR REC START/STOP can also be assigned by the assignable switch.*

CNU-500 and CNU-700, Camera Command Network Units

The CNU-700 and CNU-500 Camera Command Network Units form the technical “nerve center” of a star-shaped camera control network, providing communication between all the units in the system. A RISC-based microprocessor system provides high-speed transfer of command signals to the HDCU-900/950 CCU for rapid response. The CNU-500 is for use in systems with up to six cameras and the CNU-700 is for use in larger systems. One CNU-700 can also control six cameras, but can be expanded to control up to 12 cameras when fitted with an optional expansion board. Several CNU-700 units can be connected to the camera control network in a large system.

HDVF-C700W and HDVF-C750W, Multi-format LCD HD Color Viewfinders

The viewfinders developed for the HDC-900 and HDC-950/930 cameras are of a new, innovative design that is based on a 6-type TFT color LCD panel providing a resolution of 960 pixels horizontally x 540 pixels vertically. These viewfinders feature very low power consumption and, as they are very compact, their panning and tilting angles are greater than those of CRT-based viewfinders. The HDVF-C700W is for use with the HDC-900 camera and the HDVF-C750W for use with the HDC-950/930 portable camera.

** The liquid crystal display fitted to this unit is manufactured with high precision technology, giving a functioning pixel ratio of at least 99.99 %. Thus a very small proportion of pixels (at most 0.01 %) may be “stuck”, constantly on or constantly off. In addition, over a long period of use, because of the physical characteristics of the liquid crystal display, such “stuck” pixel may appear spontaneously. These problems have been kept to an absolute minimum, but are an unavoidable characteristic of liquid crystal technology.*

HDVF-700A and HDVF-20A, CRT-based Viewfinders

The monochrome CRT-based viewfinders, HDVF-700A (7-type) and HDVF-20A (2-type), can also be used with the HDC-900/950/930.



2 Total System

2 2-1. System Configuration

As a major design criteria, the HDC-900 Series inherited all the benefits from Sony digital camera systems such as the BVP-900/700/500 Series to ensure the HDC-900/950/930 Family to be smoothly integrated into these renowned, field-proven camera control systems.

This new camera system features two camera heads, the HDC-900 full-size model and its full companion portable camera, the HDC-950/930. The portable model is designed for full integration into an HDC-900 studio system, as well as being used as a standalone acquisition camera.

In addition to the new peripherals such as HDCU-900/950, RCP-750/751, and RM-B750, a variety of key peripherals like the CNU-700 and CNU-500 Camera Command Network Units help users to easily expand/upgrade their systems.

Figure 2-1: HDC-900/950 System Configuration

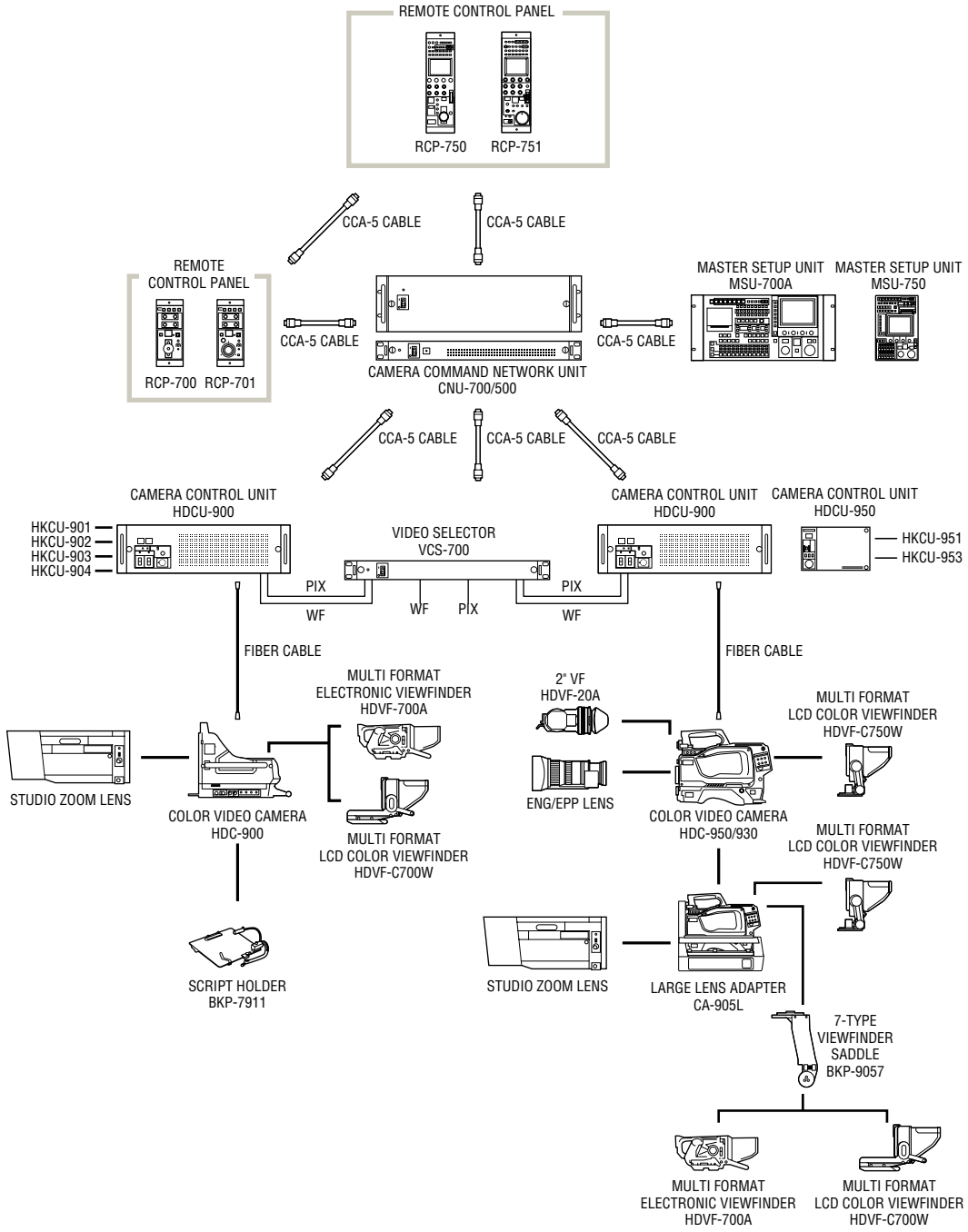


Figure 2-2: Optional Accessories for the HDC-900

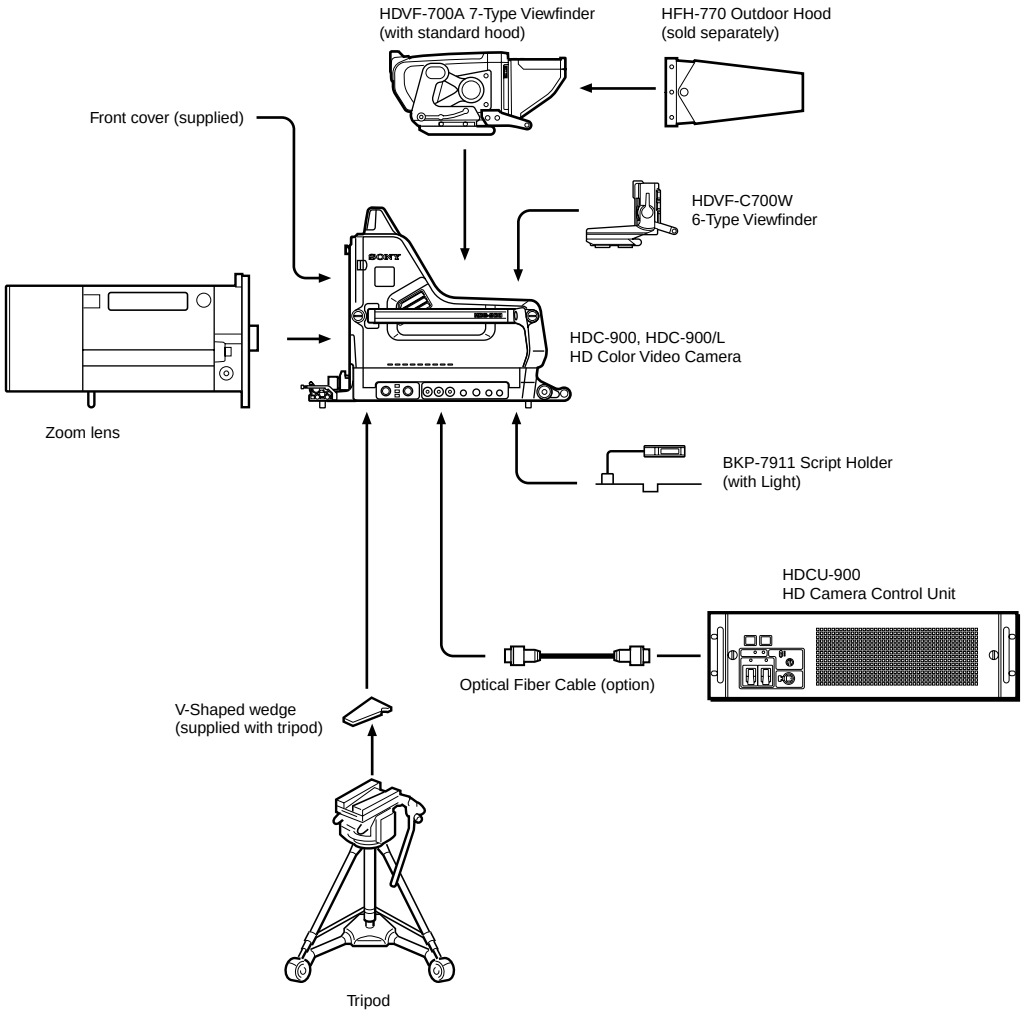


Figure 2-3: Optional Accessories for the HDC-950/930

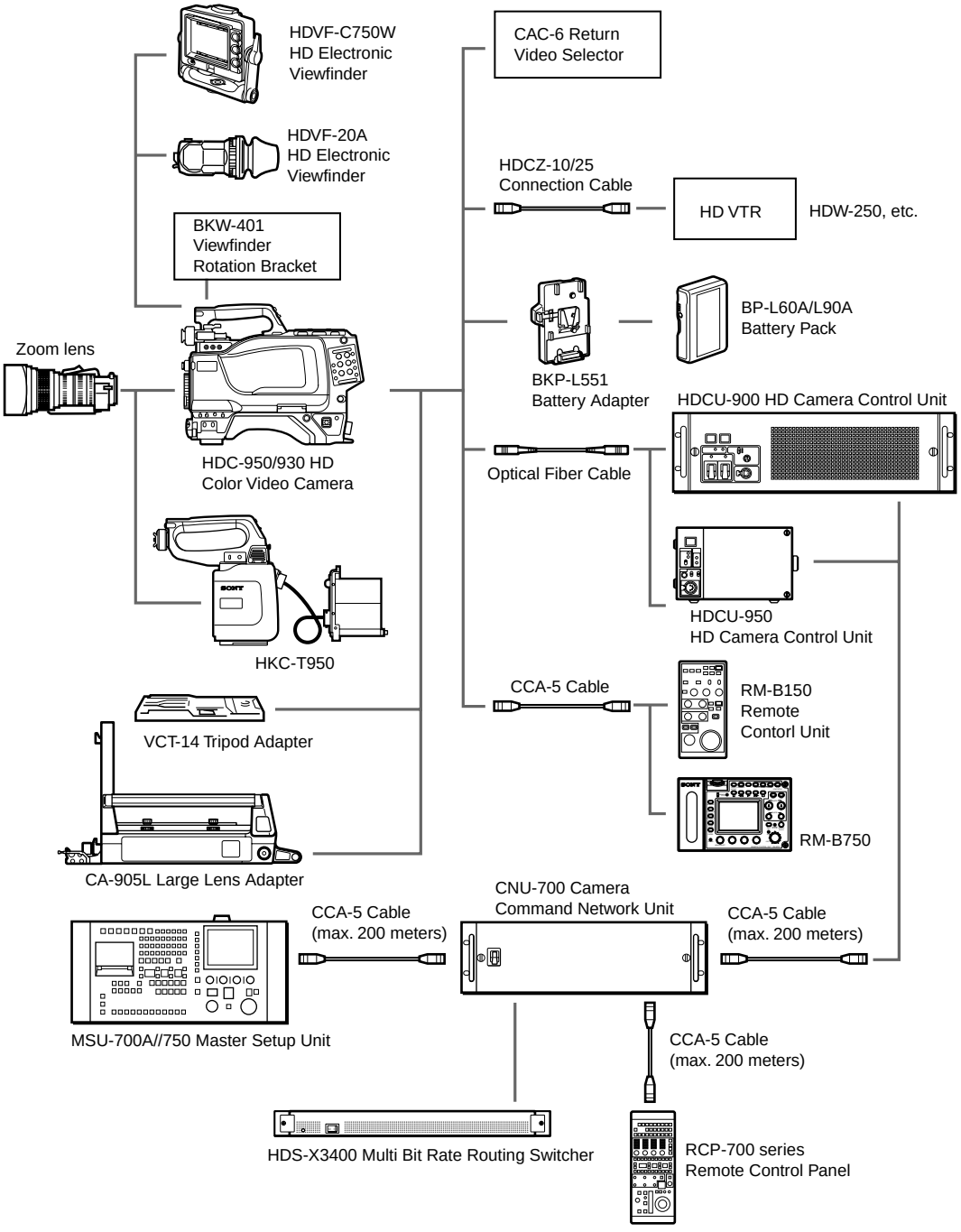
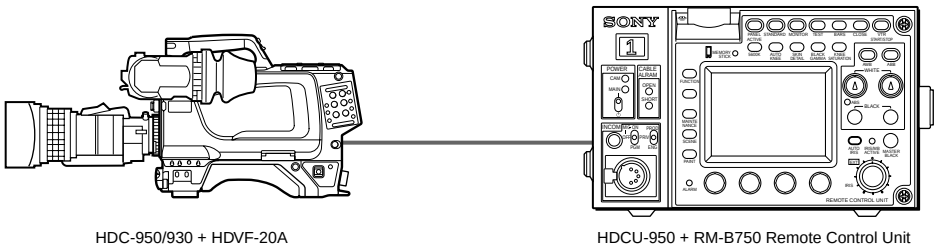


Figure 2-4: HDC-950 Stand-alone System



HDC-950/930 + HDVF-20A

HDCU-950 + RM-B750 Remote Control Unit

2-2. Camera Head

The HDC-900 Series is an outstanding new-generation HD camera with a true multi-purpose system in which many new technologies have been incorporated such as Sony's ADSP (Advanced Digital Signal Processing), a newly developed 2.2-million pixel CCD and 12-bit A/D conversion. 12-bit A/D conversion improves gradation analysis by a factor of four compared to 10-bit conversion, significantly improving control over picture tonal reproduction, and accuracy of color reproduction. A 600% dynamic range in conjunction with the 12-bit A/D and the superior DSP processing ensure superb processing of overexposed picture information and the handling of specular highlights. Just some of the state-of-the-art features are:

- Optical filter wheels
- Multiple output capability
- Optical fibre digital transmission
- Memory Stick (media card operation)
- Triple skin tone detail
- Adaptive detail control
- Electronic soft focus
- Adaptive highlight control
- Knee saturation
- Multi matrix control

These improvements contribute to an unsurpassed image quality, making the HDC-900 Series a true 'top-of-the-line' studio/OB camera.

The HDC-950/930 is the portable version of the HDC-900 and has identical video processing circuitry. Both models have the same signal performance and can be controlled either at the camera head or by remote control through studio system peripherals such as the HDCU-900/HDCU-950 Camera Control Unit, MSU-700A/750 Master Set-up Unit and CNU-700/500 Camera Command Network Units. Because of this design concept, users of the HDC-950/930 have the same features, the same operational performance and the same operational 'feel' as the HDC-900 - an optimized solution to meet the needs of high-end users for a companion studio portable camera.

The flexible interfacing of the HDC-900 and HDC-950/930 means that they are not only high-end HD broadcasting cameras, but they can also be easily integrated into conventional studio/OB vehicle systems that use earlier BVP-900/700/500 Series cameras.

The HDC-900/950 family has the following features:

High picture quality and high performance

The new 2/3-type 1080 FIT CCD with 2,200,000 pixels, a unique CCD output signal processing circuit, and a 12-bit A/D converter provide high picture quality and excellent performance for the HDC-900 and HDC-950. A high-cost-performance IT type - HDC-930 - is also available.

Newly designed integrated unit (HDC-950/930 only)

Low power consumption and high efficiency of heat radiation were -addressed by integrating the camera and camera adapter into a single unit, improving the reliability. In addition, five filter discs each for CC and ND are provided as standard to match the operability of the studio-use HDC-900.

Multiple formats

The HDC-900 and HDC-950 operate with various formats, covering 24PsF, 50i, 25PsF, 30PsF, as well as 60i systems, while the HDC-930 operates with 50i and 60i systems.

Memory Stick*1 operation

The camera is equipped with a Memory Stick drive, which enables setup data storage and software upgrading using Memory Stick media cards.

*1 "Memory Stick" is a trademark of Sony Corporation.

Selection of gamma table

Multiple gamma tables are provided, enabling you to use multiple formats and perform flexible image creation.

Wide variety of detail control functions

Skin tone detail function

Allows control (emphasis or suppression) of the detail level for just a certain hue or chroma area in the image, by creating a detail gate signal from hue color components centered on skin tones. **Detail boost frequency control**

The boost frequency can be adjusted from 20 MHz to 30 MHz. This allows the detail thickness to be set appropriately for the subject, thus enabling more subtle image expression.

H/V ratio control

The ratio between horizontal and vertical detail can be adjusted.

White/black limiter

The white side and black side detail can be limited independently.

Easy menu-based setting

Selections and settings for shutter speed, ECS, Super EVS mode, viewfinder display items, video gain, safety zone marker*2 or center marker*3, screen size marker, etc. may be made quickly and easily using setup menus displayed on the viewfinder screen or an external monitor.

*2 ***Safety zone marker***: *A box-shaped marker displayed on the viewfinder screen which indicates 80%, 90%, 92.5%, or 95% of the total screen area.*

*3 ***Center marker***: *A cross-shaped marker that indicates the center of the viewfinder screen.*

Wide variety of viewfinder display options

Along with items such as operation messages, a zebra pattern*4, a safety zone marker, and a center marker, camera settings may also be displayed on the viewfinder screen using text and symbols. Further, there are other indicators arranged above and below the viewfinder, such as a tally lamp, battery warning indicator, and an indicator to tell that one or more settings are other than standard. This makes it simple to check the status of the camera.

*4 ***Zebra pattern***: *A stripe pattern displayed on the viewfinder screen which indicates the portions where the video level is above about 70% or 100%. Used to check the video level of the subject.*

Optical digital transmission

The camera uses electro-optical composite cable for 1.5-gigabit digital optical transmission between the camera and a camera control unit.

High-resolution 2-type multi-format viewfinder (HDC-950/930 only)

Along with developing the HDC-950, a 2-type multi-format viewfinder HDVF-20A is provided.

Prevention of electrical shock

When the power connection is unsafe, the power supply from the HDCU (Camera Control Unit) will be shut off.

Wide variety of input and output connectors

- Optical connector
- HD SDI output connector
- DC power supply input connector
- Prompter signal output connector
- RCP connector
- VTR connector
- Lens connector
- Viewfinder connector
- Intercom connector
- Analog audio input connectors
- Tracker connector
- Test output connector
- Return control connector
- AC OUT connector
- Large lens connector

2-3. Camera Control Unit

The HDCU-900 Camera Control Unit carries out signal processing and offers an interface for external equipment. By incorporating a optical digital transmission and digital control system, as well as multiple inputs and outputs, the HDCU-900 provides maximum camera performance combined with flexible operation. It has been designed to achieve the highest reliability, afford easy maintenance and allow flexible system configuration.

The HDCU-900 features a down converter to convert HD*1 signals to SD*2, and a return video up converter to convert SD signals to HD, making it usable with standard definition color video cameras as well as high-definition color video cameras. It can be combined with an optional MSU-700A/750 Master Setup Unit or an optional RCP-750/751/700/701 Remote Control Panel to form a camera control system that meets your system needs. Furthermore, a system capable of controlling multiple video cameras can also be -configured - by adding a CNU-700/500 Camera Command Network Unit.

*1 *High Definition (HD) signal: A name for 1125-line high-definition TV signals.*
*2 *Standard Definition (SD) signal: A name for NTSC/PAL, 525/625 component, or 525/625 composite signals.*

The HDCU-950 Camera Control Unit is also available for use with the HDC-950 and HDC-930 cameras. Its compact body and multiple video outputs make this unit ideal for field use. A stand-alone system can be easily configured by attaching the control panel of the RM-B750 Remote Control Unit to the HDCU-950, which allows you to directly operate the connected camera from the HDCU-950.

The HDCU-900 and HDCU-950 camera control units have the following major features:

Multiple video inputs and outputs (HDCU-900 only)

The HDCU-900 has four sets of HD-SDI (Serial Digital Interface) signal inputs and outputs, and four sets of SD component SDI signal inputs and outputs. Adding of various optional function boards allows the following signal input and output:

HKCU-901 SD Analog Interface board
This provides the capability of PAL, NTSC, and SD analog component signal input and output.
HKCU-902 HD Analog Interface board
This provides HD analog signal input and output.
HKCU-903 Frame Rate Converter board
This provides 60i-/50i-format output in a 24P Cinema Production system.
HKCU-904 Line Converter board
This provides 720/60P input and output.

Multiple video outputs (HDCU-950 only)

The HDCU-950 has three HD-SDI (Serial Digital Interface) signal outputs (2 regular outputs and 1 monitor output) and two SD component SDI signal outputs. Adding the optional units allows the following signal outputs:

HKCU-951 SD Encoder board
This provides the capability of NTSC (or PAL) SD analog component signal output.
HKCU-953 HD Frame Rate Converter board
This provides 60i-/50i-format HD and SD signal outputs in a 24P Cinema Production system.

Three return video inputs (HDCU-950 only)

The HDCU-950 has three return video input connectors, which receive either HD SDI, SD component SDI or analog VBS signals (mixed input of different signals is not allowed), may be set to 4:3 edge crop, 16:9 squeeze, or letterbox.

External reference signals

The HDCU-900/950 family can be locked to an external reference signal. Either an HD tri-level sync signal or an SD sync (black burst) signal may be used as the reference signal.

Internal down converter

When the system is operating at a 59.94/50 Hz field frequency, HD signals can be converted to SD component SDI signals using the down converter. The output signal aspect ratio may be set to 4:3 edge crop, 16:9 squeeze, or letter box. The down converter has independent image enhancement, gamma control, and matrix ON/OFF features, and can be controlled externally.

Internal up converter

The HDCU-900/950 family has an up converter to allow monitoring of SD signal return video using an HD viewfinder. The aspect ratio of the return video signal may be set to 4:3 edge crop, 16:9 squeeze, or letter box.

Optical digital transmission

The HDCU-900/950 can be connected to a camera with the use of an optical fiber cable (two single-mode optical fiber lines, two power lines, two control lines) for the transmission of digitized video, audio, and control signals. By connecting optical fiber cables, signals can be transmitted up to a maximum of 3000 meters (1.86 miles) when using the HDCU-900 and up to 1200 meters (0.7 mile) using the HDCU-950. The maximum length of the cable supplying power to the camera varies with the camera system configuration and with the type of optical fiber cable.

Safety-oriented power supply

The HDCU-900/950 is designed for safety. When the power is turned on, a low voltage is supplied at first. Only after it has been verified that an appropriate camera is attached, the normal 240 V power supply is activated. The power is not supplied unless a camera is connected via an optoelectric cable.

Also, the HDCU-900/950 is equipped with an alarm indicator to warn of open or short circuits in the cable.

Wide range of audio functions

The HDCU-900/950 family has connectors for two-channel microphone outputs, a digital audio output, and a program audio input. The family can use an intercom system with two independent channels, and supports four-wire and RTS intercom systems. Further, a Clear-Com system can also be supported.

Note

For information on support for RTS systems, contact a Sony service or sales representative.

Remote control

The levels and phases of the HDCU-900/950 output signals can be controlled remotely by an MSU-700A/750 Master Setup Unit.

Microphone volume control

The camera's microphone volume can be controlled via the MIC REMOTE connector.

Character signal output

The results of the HDCU-900/950 self-diagnosis can be obtained with a text display by an SD character signal output.

Rack mountable

The HDCU-900 can be installed in a full 19-inch rack of 3U height, while the HDCU-950 can be installed in a half 19-inch rack of 3U height in combination with the RMM-301.

Plug-in unit configuration

Internal printed circuit boards used in the HDCU-900/950 are designed for easy plug-in and removal for easy inspection and maintenance. Furthermore, the power supply housed in the HDCU-900 is also a plug-in type unit.

2-4. Control System

In addition to the MSU-700A/750 Master Set-up Unit and several types of RCP-700 Series Remote Control Panels, the CNU-700 and CNU-500 Camera Command Network Units form the command nerve center for a new concept in a camera control system. A wide selection of control peripherals allows each user to configure the most suitable system to meet a specific operational need. The following are the key peripherals.

Master Set-up Unit (MSU-700A and MSU-750)

The MSU-700A/750 Master Set-up Unit can control up to 6 cameras (up to 12 cameras by using an expansion board - BKP-7930) in combination with the CNU-700 Camera Command Network Unit. The adoption of an EL Touch Panel in the MSU-700A/750 helps to simplify the operation of its sophisticated control system. Data such as scene files can be stored in a world-standard PCMCIA memory card.

Camera Command Network Units (CNU-700 and CNU-500)

The Camera Command Network Units are designed to be the nerve center of the Sony camera control system for the newly developed HDC-900/950/930 family and the conventional BVP-900/700/500 SD Series of cameras. They work as 'Command Selector', 'Command Distributor' and 'Command Arbitrator'. These two types of camera command network units give a cost/performance choice. The CNU-500 is suitable for applications with up to six cameras, while the standard six-camera capability of the CNU-700 can be expanded to 12 cameras with use of the BKP-7930 optional expansion board. The carefully designed software and the high-speed CPU of both the CNU-700 and CNU-500 give them a fast response time whatever the system configuration.

Video Selector (VCS-700)

The VCS-700 Video Selector is used to switch composite video monitoring signals from an HDC-900 Series multi-camera system to a picture monitor and waveform monitor. The VCS-700 accepts the video monitoring signal from up to six HDCU-900 or HDCU-950 Camera Control Units and switches these signals to two picture monitor outputs and two waveform monitor outputs. The selection of monitoring signals can be controlled by the camera selection buttons on the MSU-700A/750 Master Set-up Unit, or by external control equipment through the D-sub 37-pin I/O port on the VCS-700. For SDI monitoring, the optional BKP-7933 S-Bus Interface Board provides connection to a Sony digital routing system.

Remote Control Panels (RCP-700 Series)

There are four ranges of remote control panels for remote control of the HDC-900 Series via the HDCU-900/950 Camera Control Unit. For the iris and master black adjustments, each range has two types - joystick control and dial control.

The RCP-750/751 is the newly developed, top of the range for sophisticated operational use, and can be used as a substitute for the MSU-700A/750 Master Set-up Unit. The panel is connected to the HDCU-Series Camera Control Unit (or the CNU-Series Camera Command Network Unit, which is connected to the HDCU-Series) by a special cable of up to 200 m (656 ft) in length.

The RCP-700/701 features the basic control items required for daily operation of camera acquisition systems.

2-5. Viewfinders

As well as the HDVF-700A, a high performance 7-type multi-format electronic monochrome viewfinder with extremely high horizontal resolution, the HDVF-C700W 6-type multi-format LCD color viewfinder is also available for the HDC-900. This multi-format LCD color viewfinder is especially convenient for cases where color needs to be identified by the camera operator. For the HDC-950, the HDVF-C750W - a 6-type multi-format LCD color viewfinder and the HDVF-20A - a 2-type HD monochrome electronic viewfinder are newly designed, which fulfill the requirement for different applications.

All of these models are very compact in size, light in weight and economical in power consumption. The low mounting positions of the HDVF-700A and HDVF-C700W provide convenient viewfinder displays aligned as close as possible to the lens axis.

The HDVF-700A has the following features:

Multiscan
In addition to the 60i format, formats such as 24PsF and 50i are supported for control signals from the camera.

16:9 display capability
When operated from an external device such as a camera control unit, the screen can be switched between 16:9 and 4:3 display modes.

High resolution
The viewfinder uses a high-resolution cathode-ray tube, providing 800 or more lines of horizontal resolution.

Stable picture
A high-voltage regulation circuit provides a stable image with a minimum of distortion, regardless of screen brightness.

Continuously variable peaking
A continuously variable peaking circuit provides a sharp image, making it easy to focus the camera.

Tally lamps
The viewfinder has red and green tally lamps which light in response to tally signals.

Superior usability
The viewfinder height may be set to one of three positions, and it may be tilted up to 60° upwards or 50° downwards.

Drip-proof construction
The drip-proof design is able to withstand light rain, making the viewfinder well suited to outdoor use.

Studio monitor hood, outdoor hood
The viewfinder may be fitted with a strong, easy-to-use studio hood (supplied), or an outdoor broadcasting (OB) hood with excellent shading ability (option).

Energy-saving design
The viewfinder will accept a wide range of power supply voltage (from 10.5 to 17 volts) with low power consumption (33 watts).

The HDVF-C750W/C700W has the following features:

Compact and lightweight
The viewfinder uses an LCD panel, making it more compact in size and lighter in weight as compared with a CRT viewfinder that has a display of the same size.

Multiscan
In addition to the 60i format, formats such as 24PsF and 50i are supported for control signals from the camera.

High resolution
The high-resolution LCD panel of the viewfinder provides 500 or more lines of horizontal resolution.

Stable picture
The LCD panel provides a stable image without distortion, regardless of screen brightness.

Step-variable peaking
Step-variable peaking circuits provide a sharp image, making it easy to focus the camera.

Tally lamps
The viewfinder has red and green tally lamps which light in response to tally signals.

Superior usability
The height of the HDVF-C750W can be set to one of three positions. It can be tilted up to 90° upwards or 90° downwards, and can be panned up to 90° -to the left or 90° -to the right. The HDVF-C700W can be tilted up to 90° upwards or 50° downwards.

Drip-proof construction
The drip-proof design is able to withstand light rain, making the viewfinder well suited to outdoor use.

Studio monitor hood, outdoor hood
The viewfinder can be fitted with a strong, easy-to-use hood (supplied), or an outdoor hood with excellent shading ability (option).

Energy-saving design
The viewfinder will accept a wide range of power supply voltage (from 10.5 to 17 volts) with low power consumption (10 watts).

The HDVF-20A has the following features.

Multiscan
In addition to the 60i format, formats such as 24PsF and 50i are supported for control signals from the camera.

High-performance CRT
- Quick-start type (The image appears as soon as the camera is turned on.)
- Enhanced resolution
- Reduced flare

Marker indication
When the camera setting allows the center marker or safety zone marker indication, the viewfinder can set the marker indication on or off.

Removable eyepiece
Detaching the eyepiece gives you a clear view of the center of the screen even with your eye away from the viewfinder. You can clean dust from the screen or the mirror by detaching the eyepiece.

Other features
Fitting an optional fog-proof filter (Part No. 1-547-341-12) over the viewfinder lens prevents breath or vapor condensation on the lens.

2-6. Optional Accessories

For HDC-900

HDVF-700A	HD Electronic Viewfinder (7-type, monochrome)
HDVF-C700W	HD Electronic Viewfinder (6-type, color)
VFH-770	Outdoor Hood
BKP-7911	Script Holder (with script light)
CAC-6	Return Video Selector
EX-738(A-8327-351-A)	Extension Board

For HDC-950/930

BKP-L551	Battery Adaptor
BKW-401	Viewfinder Rotation Bracket
C-74	Microphone
CA-905L	Large Lens Adaptor
CAC-6	Return Video Selector
CAC-12	Microphone holder
CRS-3P	Cradle Suspension
HKC-T950	CCD Block Extension Adaptor
HDVF-20A	HD Electronic Viewfinder
HDVF-C750W	HD Electronic Viewfinder
MSA-8A/16A /32A/64A	Memory Stick Media Card
VCT-14	Tripod adaptor
EX-738(A-8327-351-A)	Extension Board

For HDCU-900

AC power cord:	USA and Canada: 1-551-812-XX Other countries: 1-782-929-XX
Power cord plug holder:	USA and Canada: 2-990-242-01 Other countries: 3-613-640-01

HKCU-901	SD Analog Interface Unit
HKCU-902	HD Analog Interface Unit
HKCU-903	Frame Rate Converter Unit
HKCU-904	Line Converter Unit
CCA-5-3	Connection Cable (3 meter/10 feet)
CCA-5-10	Connection Cable (10 meter/33 feet)
EX-450(A-8314-633-A)	Expansion Board

For HDCU-950

AC power cord:	USA and Canada: 1-551-812-XX Other countries: 1-782-929-XX
Power cord plug holder:	USA and Canada: 2-990-242-01 Other countries: 3-613-640-01
HKCU-951	SD Encoder Unit
HKCU-953	HD Frame Rate Converter Unit
CCA-5-3	Connection Cable (3 meter/10 feet)
CCA-5-10	Connection Cable (10 meter/33 feet)
RMM-301	Rack Mount Adaptor
EX-854(A-8344-228-A)	Extension Board
EX-893(A-8344-696-A)	Extension Board

For CNU/ MSU/RCP

BKP-7900	Extender Board for CNU-700/500
BKP-7930	Expansion Board for system expansion up to 12 cameras for the CNU-700
BKP-7932	BVP-370 Series Interface Board for the CNU-700
BKP-7933	S-Bus Interface Board for CNU-700
CCA-5 Cables	8p-8p cables for the CNU-700/500, MSU-700A/750, VCS-700 and RCP-700 Series
CCA-5-3	3 m
CCA-5-10	10 m
CCA-5-30	30 m

2-7. System Setup

2-7-1 *Setting the System Format using HDCU-900*

The HDCU-900 can support input and output of multiple formats. It can also support various types of user's format by installing the optional circuit boards.

The slots to which the circuit boards are inserted and the internal switches of the unit differ depending upon the system used. They need to be set according to the system used.

HDCU-900 and list of optional boards

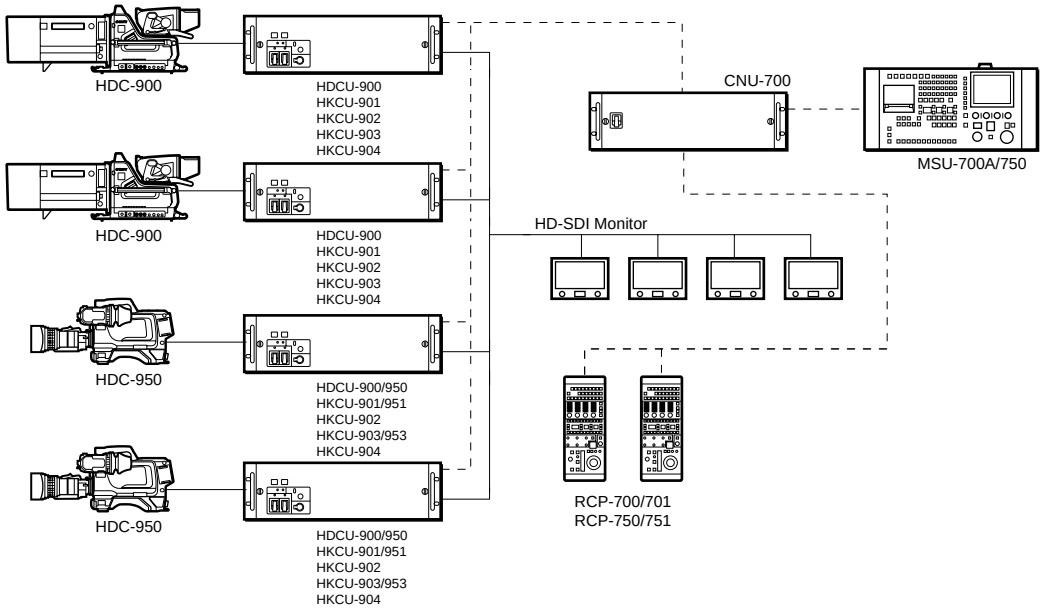
Model name	Board name (Slots on the front)	Board name (Slots on the rear)	Slot to be installed
HDCU-900	DPR-163	SDI-54A	Fixed to the top most slot
	RC-86	DIF-102	Second or third slot from the top
	AT-141	–	Fixed to the bottom most slot
SD Analog Interface Unit HKCU-901	IF-789A*1/789P*2	VDA-57	Third slot from the top
HD Analog Interface Unit HKCU-902	–	ADA-59	Second or third slot from the top
Frame Rate Converter Unit HKCU-903	FC-83	SDI-54B	Second slot from the top
Line Converter Unit HKCU-904	LC-41	SDI-54C	Second or third slot from the top

**1 for the USA and Canada.*
**2 for the countries other than the USA and Canada.*

Note

- Be sure to install the HKCU-901 of the same -regional location as the HDCU-900.
- When the HKCU-901 is going to be installed, confirm beforehand that the RC-86 board is installed in the second slot from the top on the front side, the DIF-102 board or the HKCU-902 is installed in the second slot from the top on the front side.
- When installing the optional boards, be sure to start installation from the second slot from the top on both the front side and rear side. Never install an optional board in the third slot from the top leaving the slots blank without installing the board.
- Be sure to install the HKCU-901/903/904 into the same slot on the front and rear sides.
- Do not install two or more of the same circuit boards at the same time.

2-7-1-1 HD System



Combination of boards

System format	Combination of boards (Slots on the front)		Signal input/output slot
	Second slot from the top	Third slot from the top	
1080/59.94I SDI	RC/FC/LC/–	RC/LC/IF*1/–	Top most slot
1080/59.94I SDI Film Like	FC	RC/LC/–	Second slot from the top
1080/59.94I Analog	RC*2	IF/–	Second slot from the top
	RC/FC/LC	–*3	Third slot from the top
1080/50I SDI	RC/FC/LC/–	RC/LC/IF*1/–	Top most slot

*1 *When installing the IF-789A/789P board (HKCU-901), confirm that the RC-86 board is installed in the second slot from the top.*

*2 *The second slot from the top on the rear side must have the ADA-59 board (HKCU-902) installed.*

*3 *The third slot from the top on the rear side must have the ADA-59 board (HKCU-902) installed.*

Setting switches

System format	Switch setting					
	DPR-163 board (S804 : LOCAL)			AT-141 board	FC-83 board	
	S805	S807	S806	S603	S2	S2
1080/59.94I SDI	NOT	60	Intr	/1001	*	*
1080/59.94I SDI Film Like	NOT	48	PsF	/1001	30	i
1080/59.94I Analog	NOT	60	Intr	/1001	*	*
1080/50I SDI	NOT	50	Intr	/1000	*	*

* *-NA*

Figure 2-7-1-1: Example of connection using HDCU-900 (1) – System format: 1080/59.94I SDI

Required boards

Slot to be installed	Board name (Slots on the front)	Board name (Slots on the rear)	Remarks
Top most slot	DPR-163	SDI-54A	HDCU-900
Second slot from the top	RC-86	DIF-102	HDCU-900
Third slot from the top	Blank	Blank	

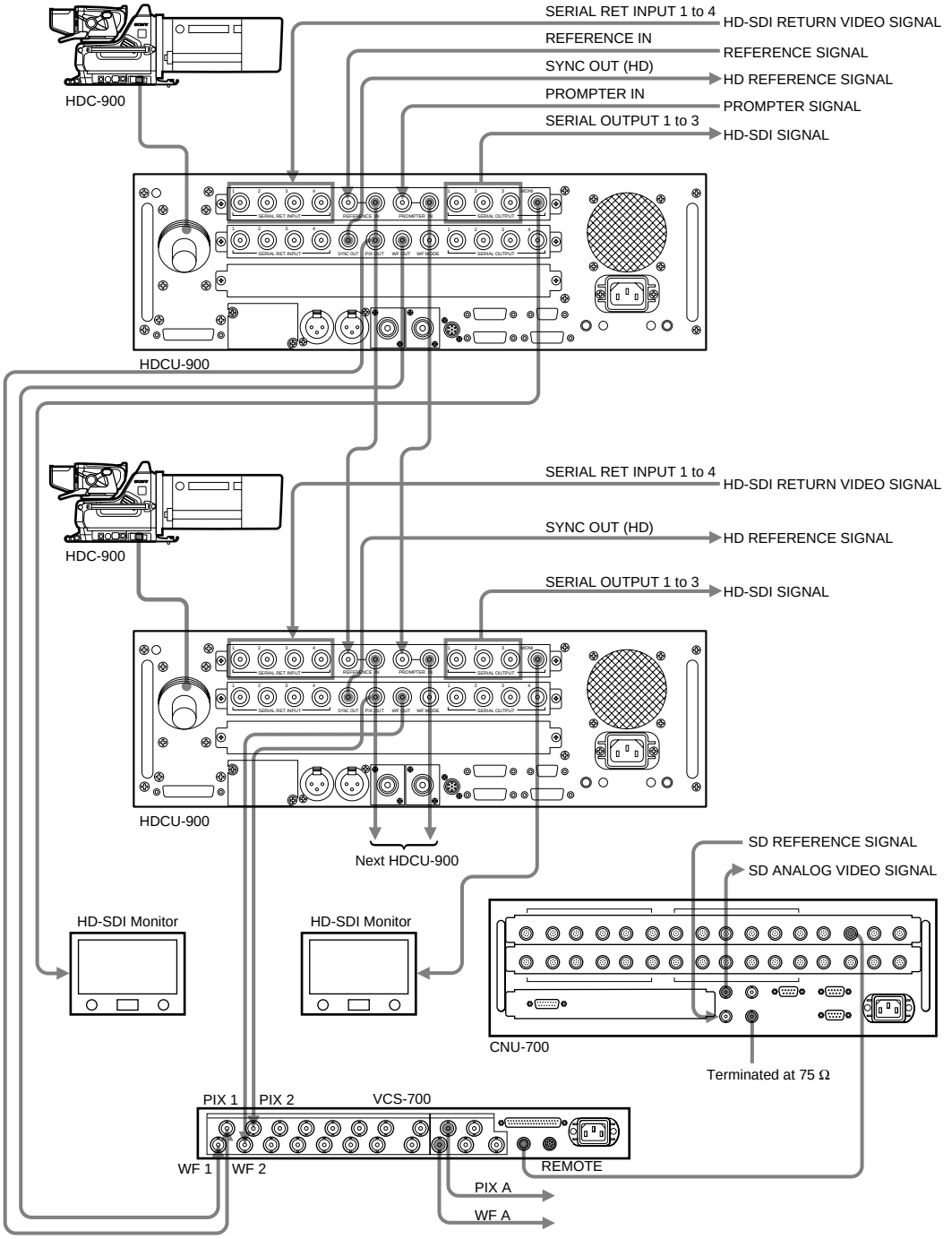


Figure 2-7-1-2: Example of connection using HDCU-900 (2) – System format: 1080/59.94I SDI Film Like

Required boards

Slot to be installed	Board name (Slots on the front)	Board name (Slots on the rear)	Remarks
Top most slot	DPR-163	SDI-54A	HDCU-900
Second slot from the top	FC-83	SDI-54B	HKCU-903
Third slot from the top	RC-86	DIF-102	HDCU-900

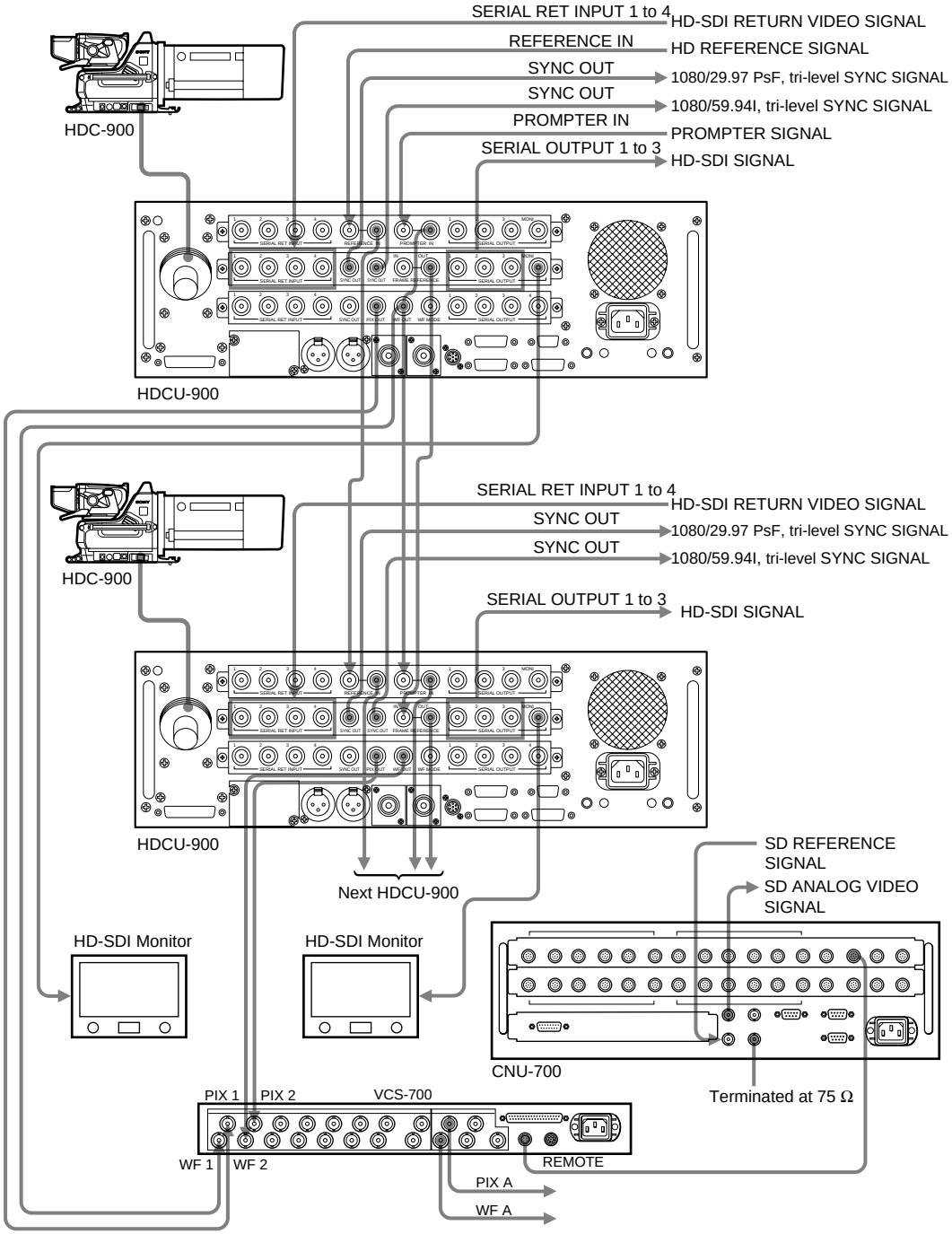
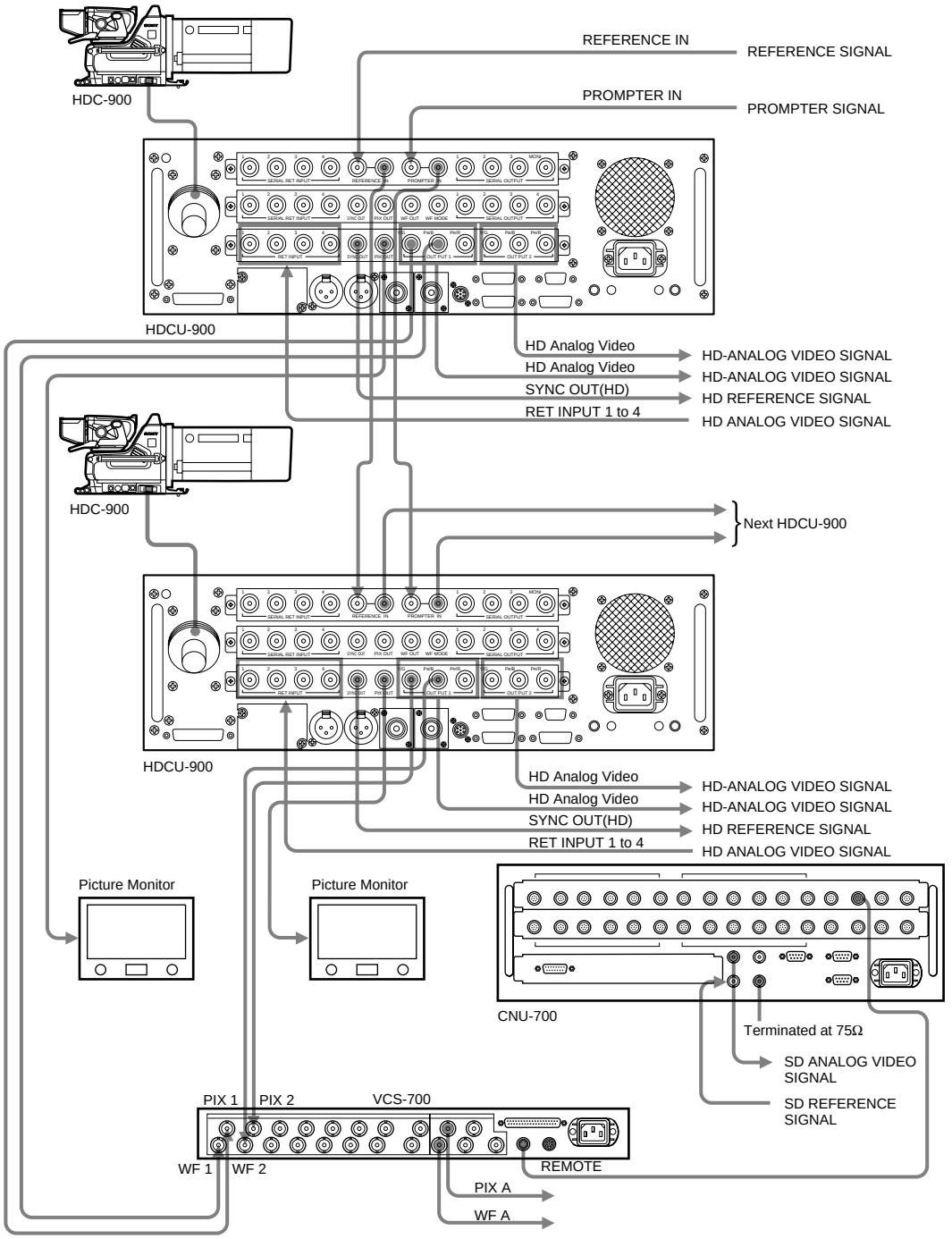


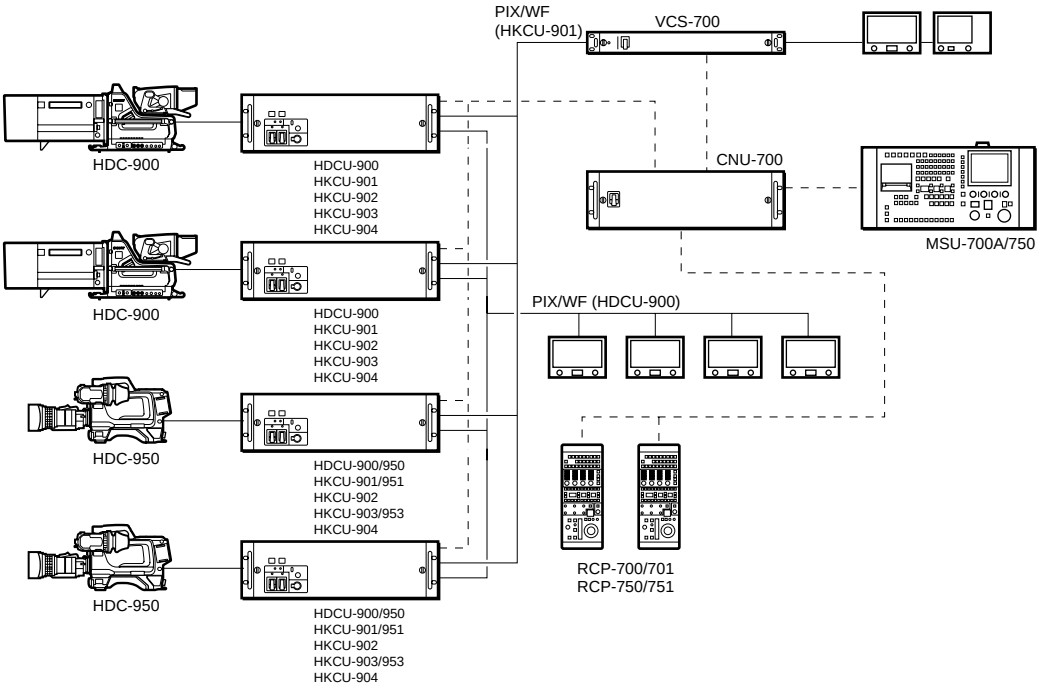
Figure 2-7-1-3: Example of connection using HDCU-900 (3) – System format: 1080/59.94I Analog

Required boards

Slot to be installed	Board name (Slots on the front)	Board name (Slots on the rear)	Remarks
Top most slot	DPR-163	SDI-54A	HDCU-900
Second slot from the top	RC-86	DIF-102	HDCU-900
Third slot from the top	Blank	ADA-59	HKCU-902



2-7-1-2 SD System



Combination of boards

System format	Combination of boards (Slots on the front)		Signal input/output slot
	Second slot from the top	Third slot from the top	
525/59.94I SDI	RC	LC/IF/–	Second slot from the top
525/29.97 PsF SDI Film Like	FC	RC	Third slot from the top
NTSC	RC	IF	Third slot from the top
625/50I SDI	RC	LC/IF/–	Second slot from the top
PAL	RC	IF	Third slot from the top

Setting switches

System format	Switch setting						
	DPR-163 board (S804 : LOCAL)			AT-141 board	FC-83 board		RC-86 board
	S805	S807	S806	S603	S2	S3	S802
525/59.94I SDI	NOT	60	Intr	/1001	*	*	525
525/29.97 PsF SDI Film Like	NOT	48	PsF	/1001	*	*	525
NTSC	NOT	60	Intr	/1001	*	*	525
625/50I SDI	NOT	50	Intr	/1000	*	*	625
PAL	NOT	50	Intr	/1000	*	*	625

* *-NA*

Figure 2-7-1-4: Example of connection using HDCU-900 (4) - System format: 525/59.94I SDI

Required boards

Slot to be installed	Board name (Slots on the front)	Board name (Slots on the rear)	Remarks
Top most slot	DPR-163	SDI-54A	HDCU-900
Second slot from the top	RC-86	DIF-102	HDCU-900
Third slot from the top	Blank	Blank	

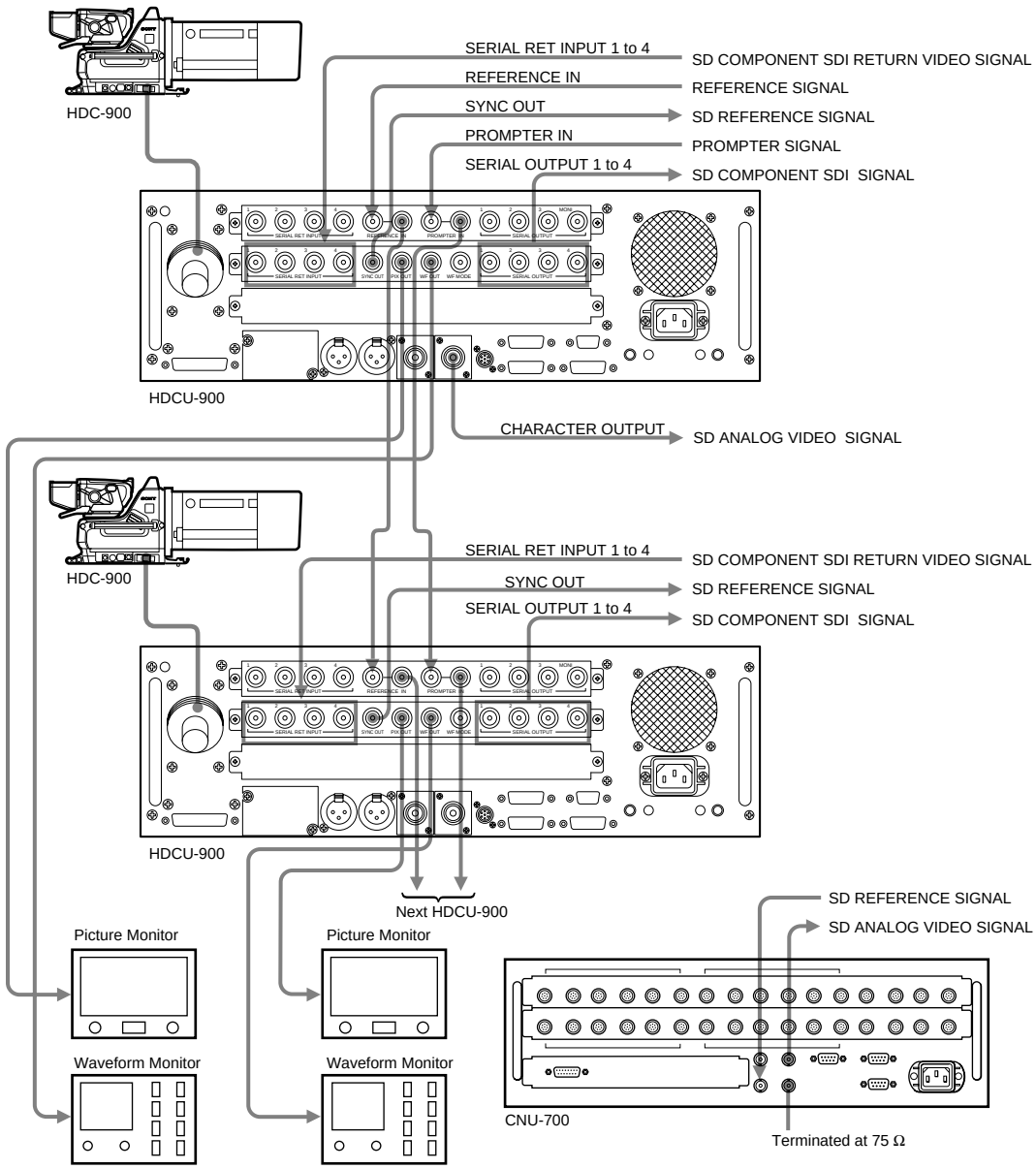


Figure 2-7-1-5: Example of connection using HDCU-900 (5) – System format: 525/29.97 PsF SDI Film Like

Required boards

Slot to be installed	Board name (Slots on the front)	Board name (Slots on the rear)	Remarks
Top most slot	DPR-163	SDI-54A	HDCU-900
Second slot from the top	FC-83	SDI-54B	HKCU-903
Third slot from the top	RC-86	DIF-102	HDCU-900

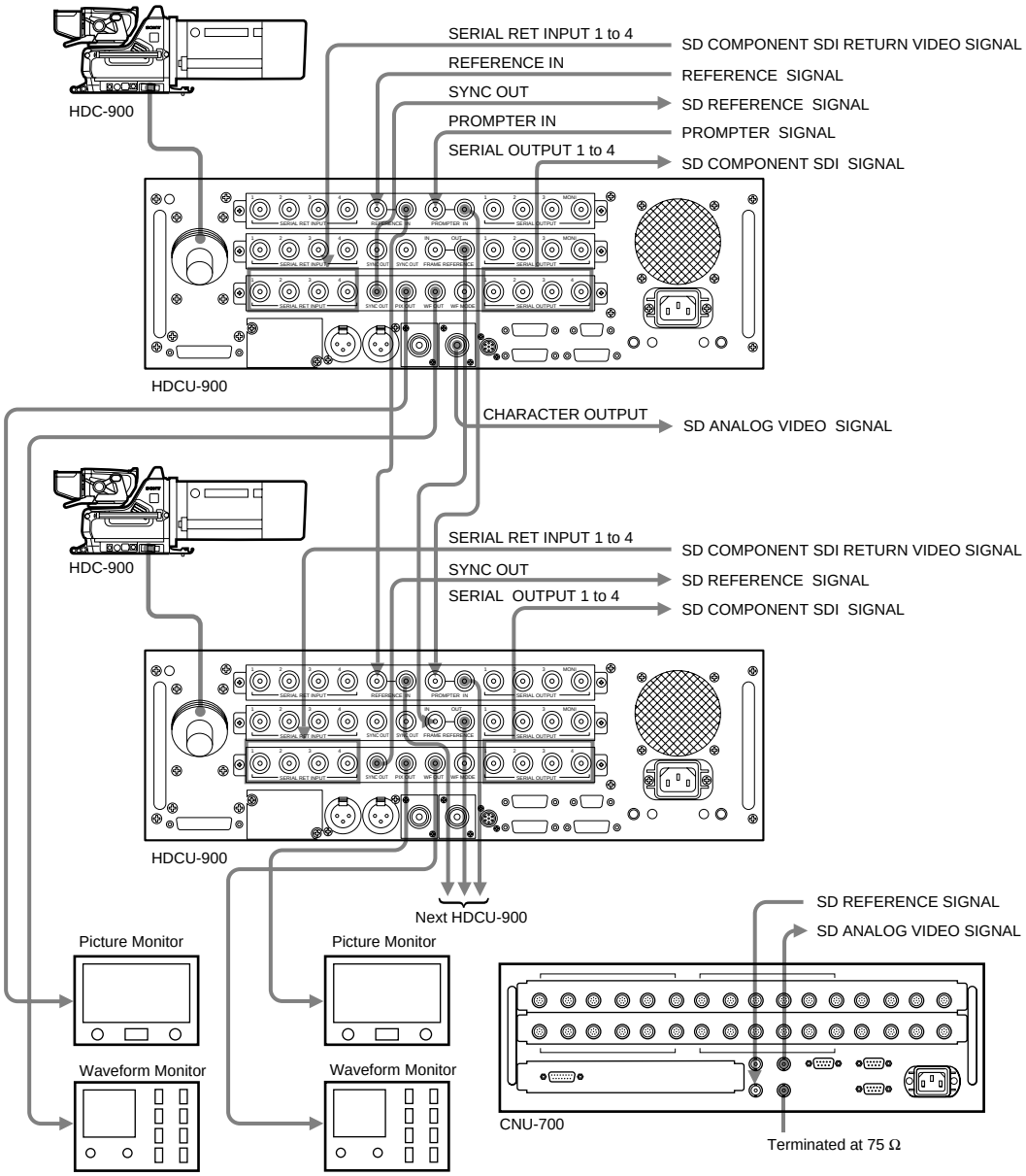
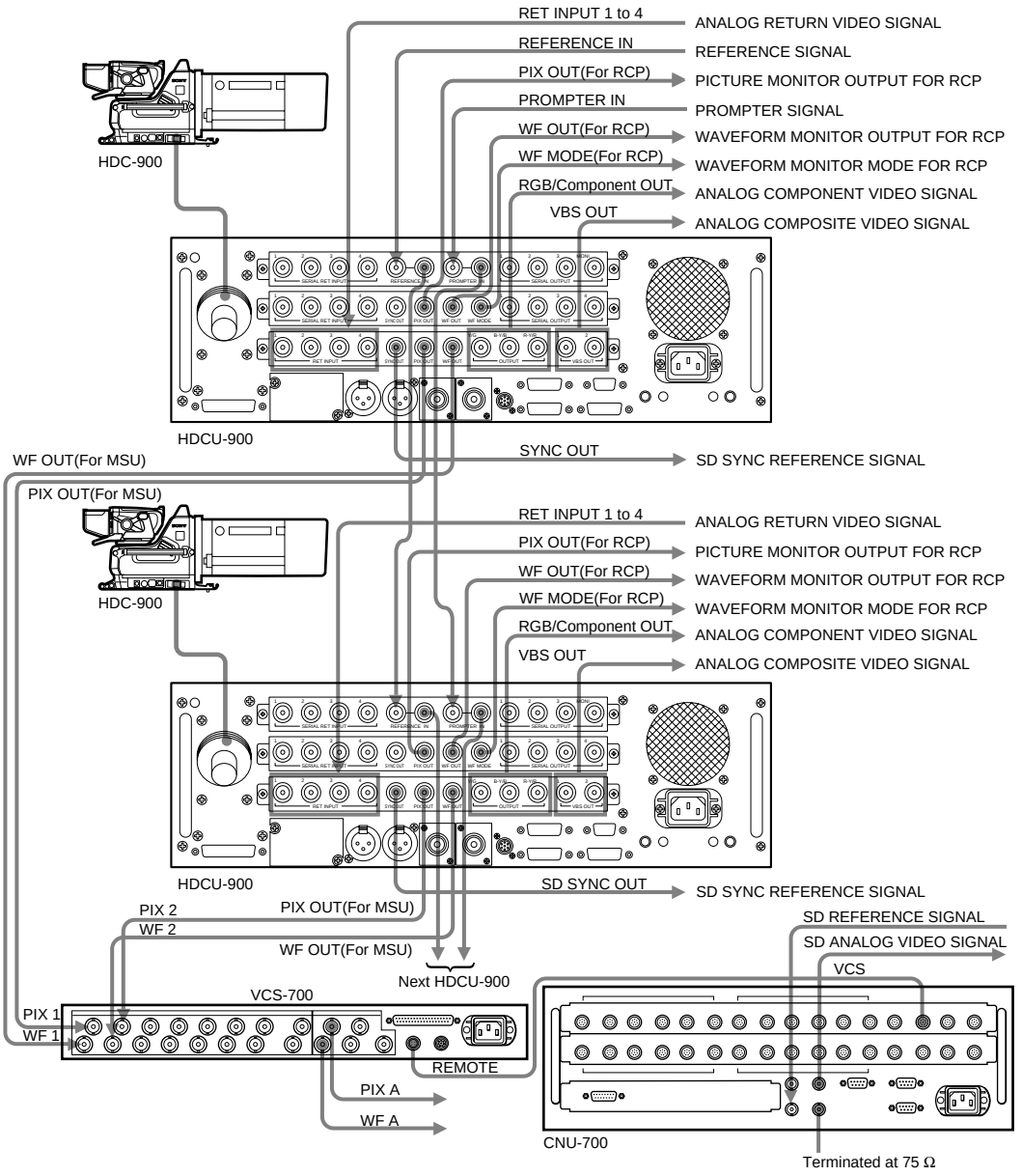


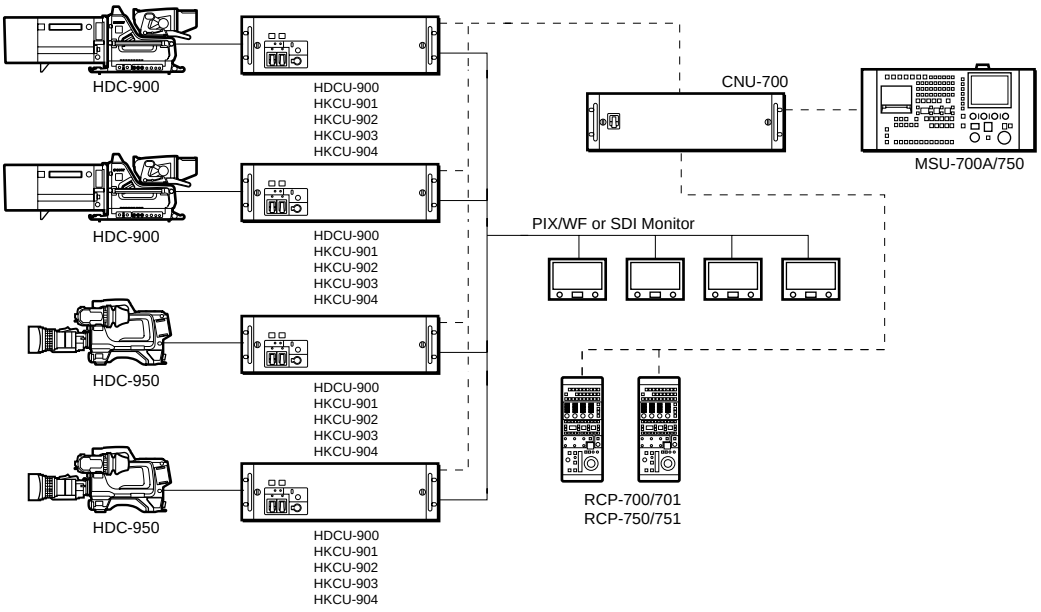
Figure 2-7-1-6: Example of connection using HDCU-900 (6) – System format: NTSC

Required boards

Slot to be installed	Board name (Slots on the front)	Board name (Slots on the rear)	Remarks
Top most slot	DPR-163	SDI-54A	HDCU-900
Second slot from the top	RC-86	DIF-102	HDCU-900
Third slot from the top	IF-789A	VDA-57	HKCU-901



2-7-1-3 Progressive and Cinema Production System



Combination of boards

System format	Combination of boards (Slots on the front)		Signal input/output slot
	Second slot from the top	Third slot from the top	
720/59.94P SDI	RC/FC	LC	Third slot from the top
720/59.94P SDI Film Like	FC	LC	Third slot from the top
1080/23.98PsF SDI	RC/FC/LC/–	RC/LC/–	Top most slot
1080/24PsF SDI	RC/FC/LC/–	RC/LC/–	Top most slot
1080/25PsF SDI	RC/FC/LC/–	RC/LC/IF*4/–	Top most slot
1080/29.97PsF SDI	RC/FC/LC/–	RC/LC/IF*4/–	Top most slot
1080/30PsF SDI	RC/FC/LC/–	RC/LC/–	Top most slot
525/29.97PsF SDI	RC	LC/IF /–	Second slot from the top

*4 *When the IF-789A/789P board (HKCU-901) is going to be installed, confirm beforehand that the RC-86 board is installed in the second slot from the top.*

Setting switches

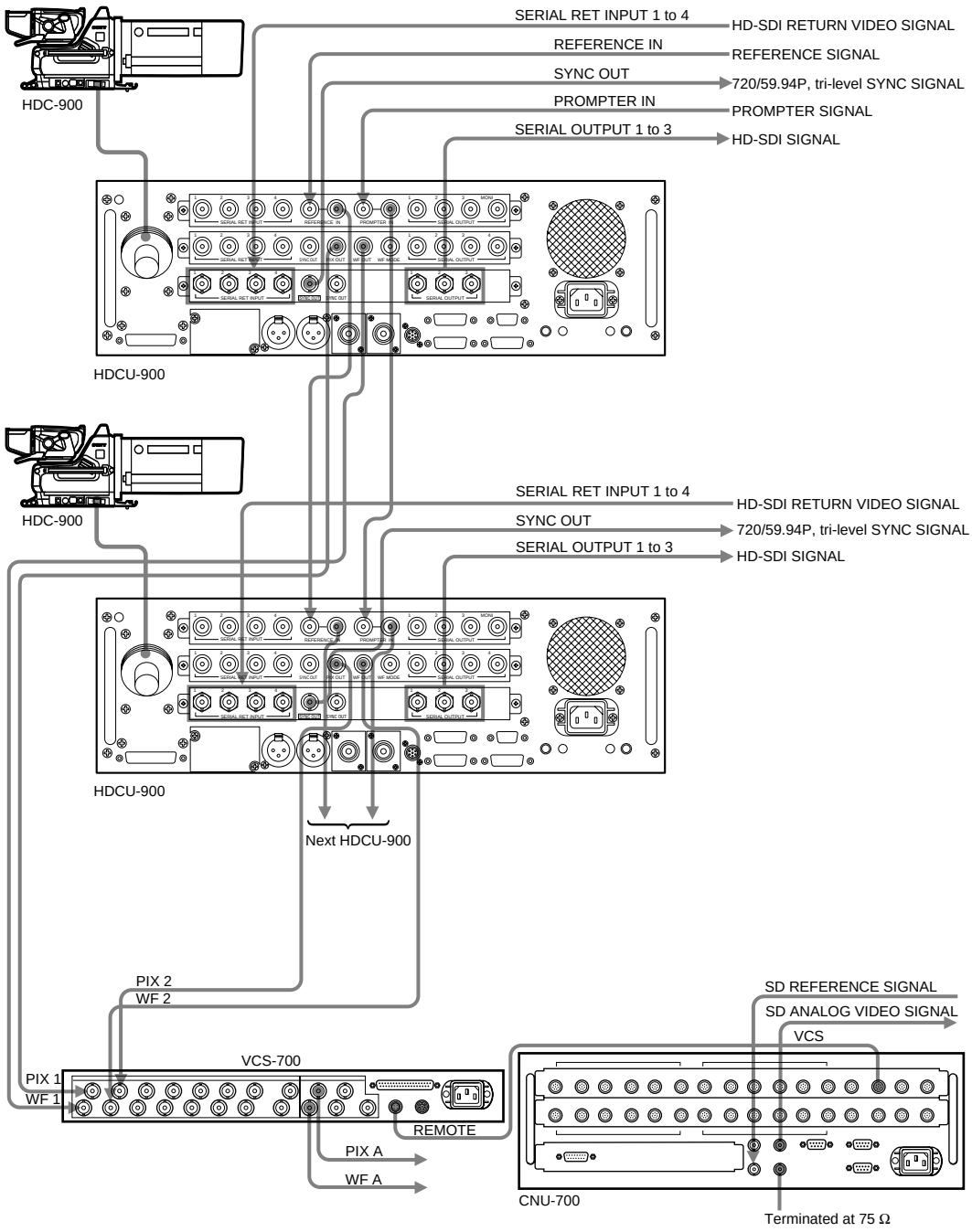
System format	Switch setting							
	DPR-163 board (S804 : LOCAL)			AT-141 board	FC-83 board		LC-41 board	RC-86 board
	S805	S807	S806	S603	S2	S3	S2	S802
720/59.94P SDI	540P	*	*	/1001	*	*	720P	*
	NOT	60	Intr					
720/59.94P SDI Film Like	NOT	48	PsF	/1001	*	*	720P	*
1080/23.98PsF SDI	NOT	48	PsF	/1001	*	*	*	*
1080/24PsF SDI	NOT	48	PsF	/1000	*	*	*	*
1080/25PsF SDI	NOT	50	PsF	/1000	*	*	*	*
1080/29.97PsF SDI	NOT	60	PsF	/1001	*	*	*	*
1080/30PsF SDI	NOT	60	PsF	/1000	*	*	*	*
525/29.97PsF SDI	NOT	60	PsF	/1001	*	*	*	525

* *-NA*

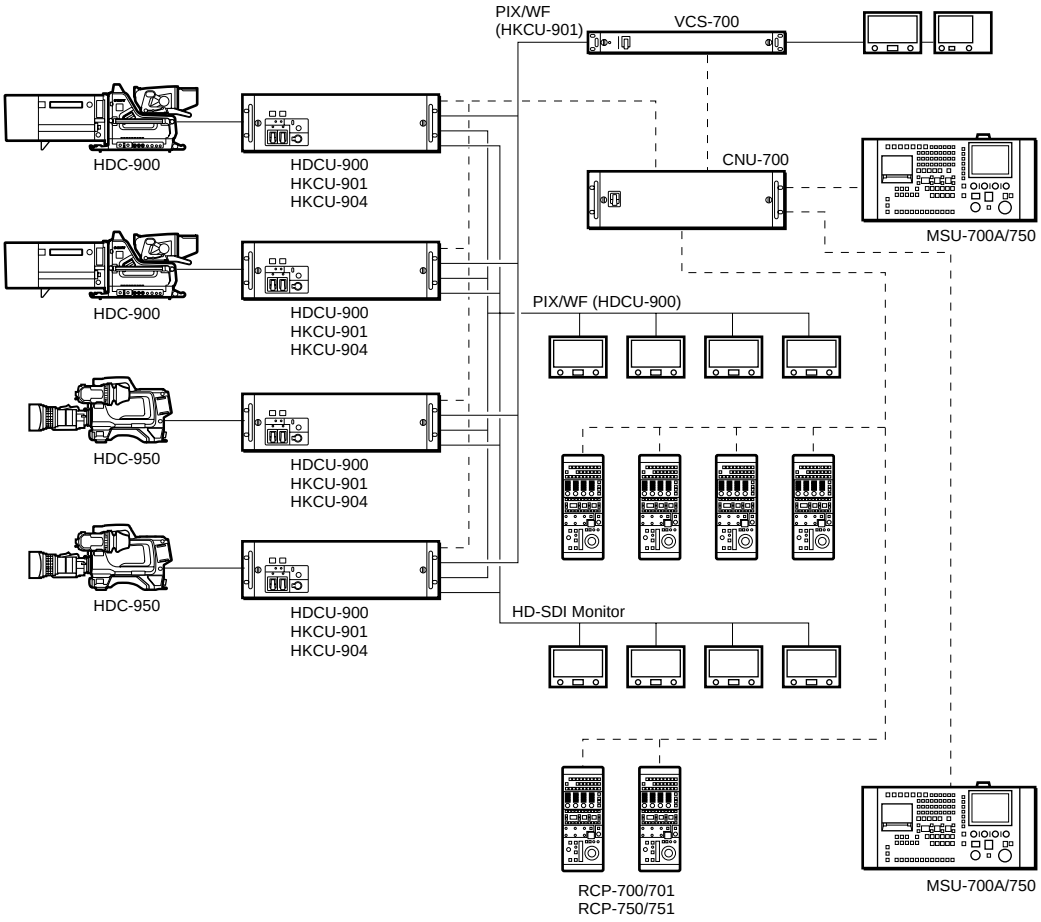
Figure 2-7-1-7: Example of connection using HDCU-900 (7) – System format: 720/59.94P SDI

Required boards

Slot to be installed	Board name (Slots on the front)	Board name (Slots on the rear)	Remarks
Top most slot	DPR-163	SDI-54A	HDCU-900
Second slot from the top	RC-86	DIF-102	HDCU-900
Third slot from the top	LC-41	SDI-54C	HKCU-904



2-7-1-4 HD/SD Simul-Cast System



Combination of boards

System format		Combination of boards (Slots on the front)		Signal input/output slot
HD	SD	Second slot from the top	Third slot from the top	
1080/59.94I SDI	525/59.94I SDI	RC	LC/IF/–	Top most slot or second slot from the top
1080/59.94I SDI	NTSC	RC	IF	Top most slot or third slot from the top
1080/50I SDI	625/50I SDI	RC	LC/IF/–	Top most slot or second slot from the top
1080/50I SDI	PAL	RC	IF	Top most slot or third slot from the top
720/59.94I SDI	525/59.94I SDI	RC	LC	Second slot from the top or third slot from the top

Setting switches

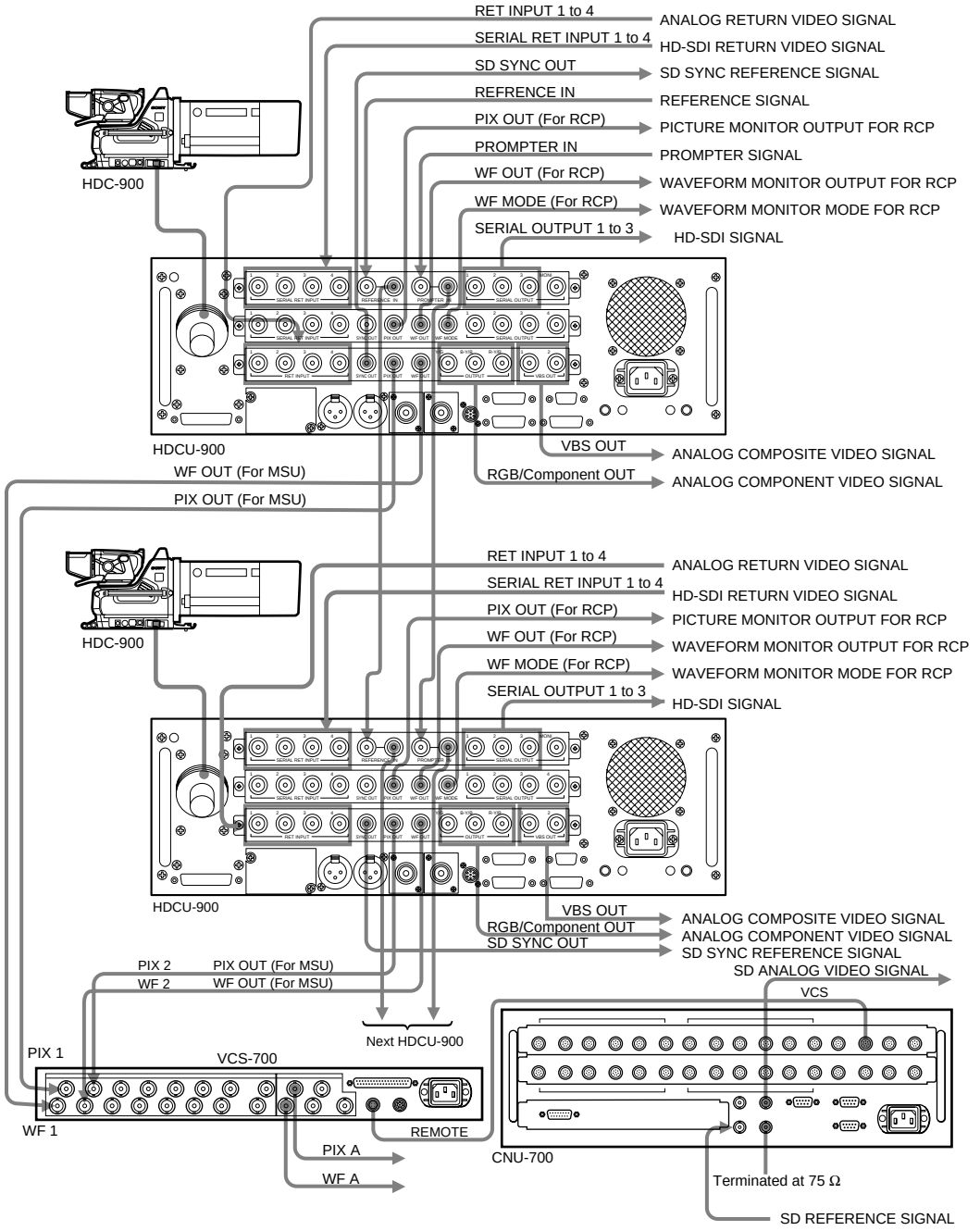
System format		Switch setting					
		DPR-163 board (S804 : LOCAL)			AT-141 board	LC-41 board	RC-86 board
HD	SD	S805	S807	S806	S603	S2	S802
1080/59.94I SDI	525/59.94I SDI	NOT	60	Intr	/1001	*	525
1080/59.94I SDI	NTSC	NOT	60	Intr	/1001	*	525
1080/50I SDI	625/50I SDI	NOT	50	Intr	/1000	*	625
1080/50I SDI	PAL	NOT	50	Intr	/1000	*	625
720/59.94I SDI	525/59.94I SDI	540P	*	*	/1001	720P	525
		NOT	60	Intr			

** -NA*

Figure 2-7-1-8: Example of connection using HDCU-900 (8) – System format: HD: 1080/59.94I SDI, SD: NTSC

Required boards

Slot to be installed	Board name (Slots on the front)	Board name (Slots on the rear)	Remarks
Top most slot	DPR-163	SDI-54A	HDCU-900
Second slot from the top	RC-86	DIF-102	HDCU-900
Third slot from the top	IF-789A	VDA-57	HKCU-901



2-7-2 Setting the System Format using HDCU-950

For a system using the HDCU-950, the output signal format must be set.
Normally the Multi-Format is set from the RM/MSU or a device that is connected externally. However, it can also be set by the switches on the AT-149 board or FC-88 (HKCU-953) board.

(1) Setting the HD-SDI output

Set the output signal format as the HD-SDI signal. At the same time, this setting becomes the shooting mode of the camera.

1. Set the field frequency coefficient.
 Setup switch : S420 on the AT-149 board (Factory setting : REMOTE)
 - 1.001 : Set the field frequency to 1/1.001 times (Set the field frequency to 1.001 when using NTSC (525/60) signal in the SD system.)
 - 1.000 : Set the field frequency to 1 time. (Set the field frequency to 1.000 when using PAL (625/50) signal in the SD system.)
 - REMOTE : Set it with RM/MSU, etc., that is connected outside.
2. Set the field frequency.
 Setup switch: S418 on the AT-149 board (Factory setting: 60 V)
 - 60 V : When the FC-88 board (HKCU-953) is not used but the NTSC (525/60) signal is used in the SD system.
 - 50 V : When the FC-88 board (HKCU-953) is not used but the PAL (625/50) signal is used in the SD system.
 - 48 V : At present, this function is not supported.
3. Set the shooting mode of the camera.
 Setup switch : S419 on the AT-149 board (Factory setting : INTR)
 - INTR : When shooting with interlacing system.
 - PROG : When shooting with progressive (PsF) system.
 - 540P : When shooting with 540-60P system. (At present, this function is not supported.)

Note:

If you select a format of 48i (48 field interlace) or another format that is not supported by the HDCU-950, the setting causes an error and the indicators (D201 to D205) on the AT-149 board will flash.

(2) Setting the SD signal output

When S420 on the AT-149 board is set to a position other than REMOTE, set the SD signal output to NTSC (525/60) or PAL (625/50).
Setup switch : S423-1 on the AT-149 board (Factory setting : OFF)

- ON : PAL (625/50)
- OFF : NTSC (525/60)

(3) Setting the frame conversion (when the HKCU-953 is installed)

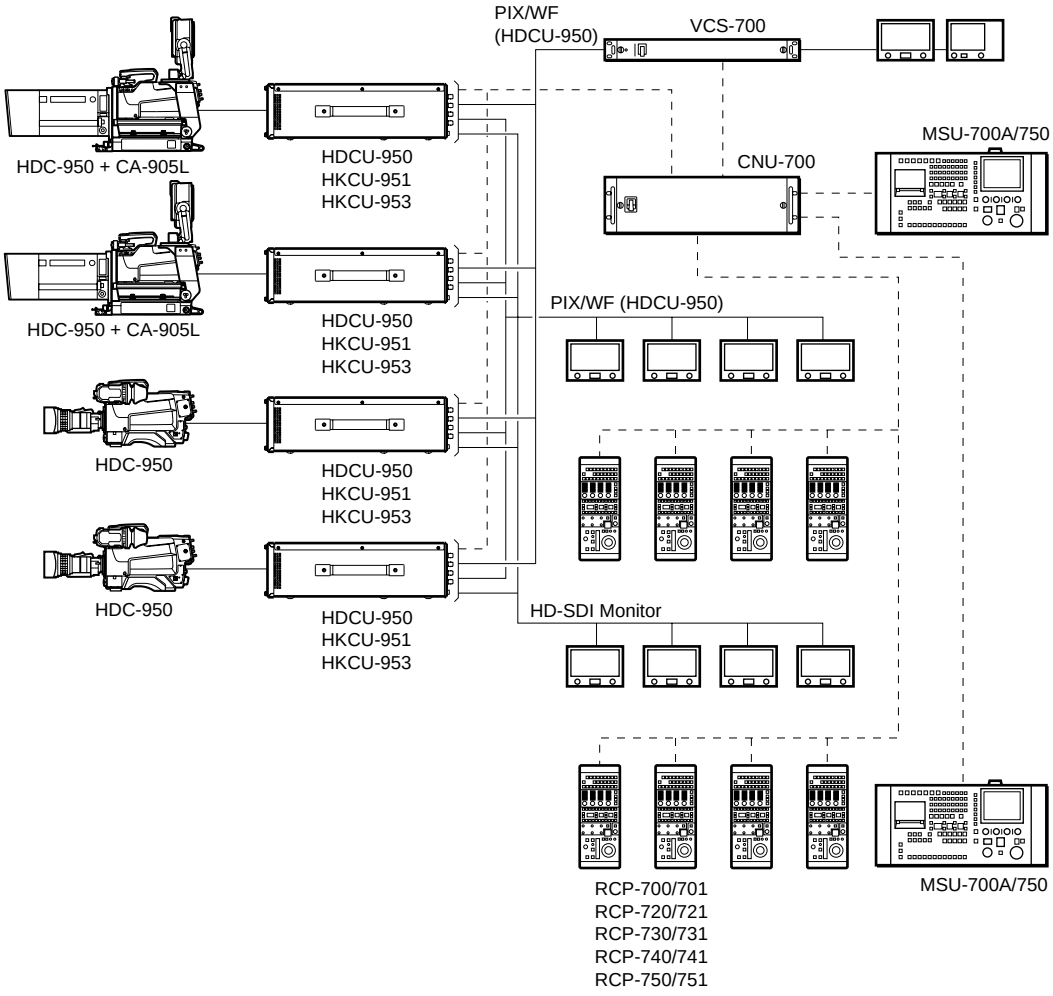
When the shooting mode of the camera is set to 24PsF, set the HD-SDI output signal format from the HKCU-953.
Setup switch : S2 on the FC-88 board (Factory setting: OFF)

- ON : When the shooting mode of the camera is set to 24PsF, the frame frequency conversion is implemented.
- OFF : The frame frequency is not converted. The same signal as the main HD-SDI signal is output.

Note:

The setting of the frame conversion frequency must follow the set format of the SD signal output.
When S423-1 on the AT-149 board is set to OFF (NTSC), the frame frequency is converted to 60i (30 Hz).
When S423-1 on the AT-149 board is set to ON (PAL), the frame frequency is converted to 50i (25 Hz).

2-7-2-1 Standard System

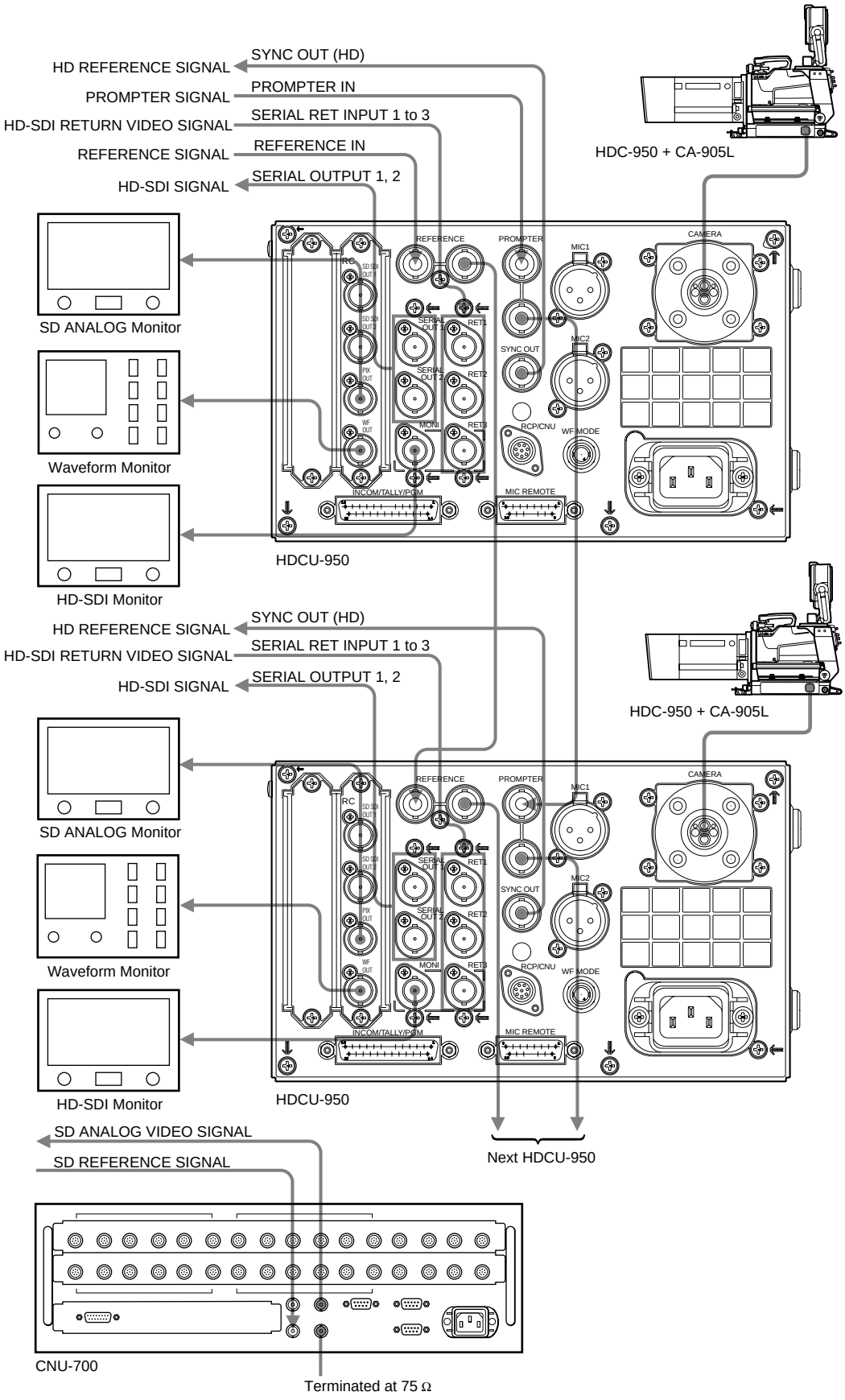


Combination of boards

Board name		Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
HDCU-950	Front side	AT-149	AVP-4	DTX-1	DRX-1	RC-91	-
	Rear side	CN-2219	CN-2220	SDI-70	HIF-5	DIF-124	-
HDCU-950 w/ HKCU-951 installed	Front side	AT-149	AVP-4	DTX-1	DRX-1	RC-91	EN-145
	Rear side	CN-2219	CN-2220	SDI-70	HIF-5	DIF-124	VDA-61
HDCU-950 w/ HKCU-953 installed	Front side	AT-149	AVP-4	DTX-1	DRX-1	FC-88	RC-91
	Rear side	CN-2219	CN-2220	SDI-70	HIF-5	SDI-73	DIF-124

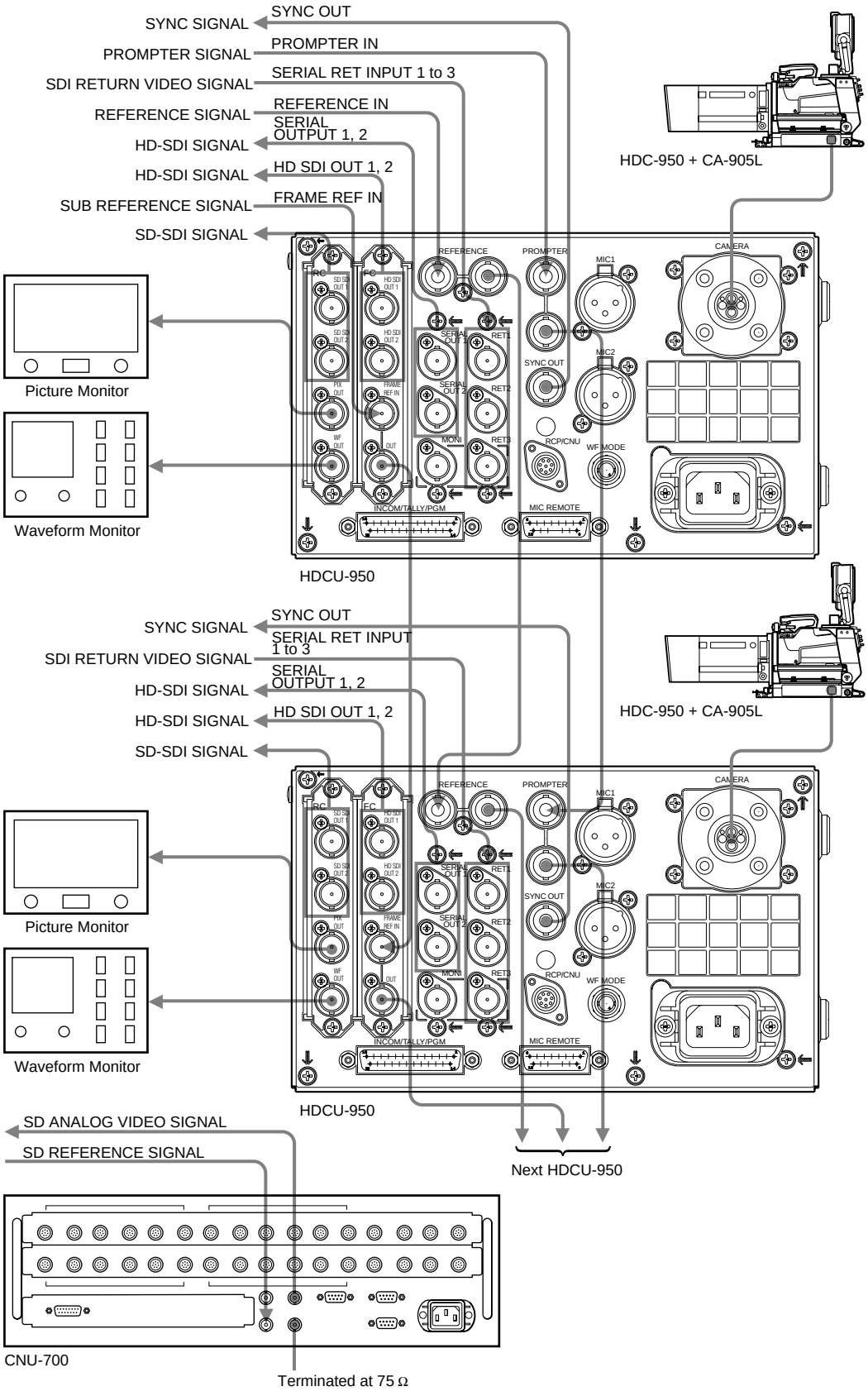
2-7-2-2 Standard HD/SD System

Figure 2-7-2-1 Example of connection using HDCU-950 (1) - System format: HD/SD system



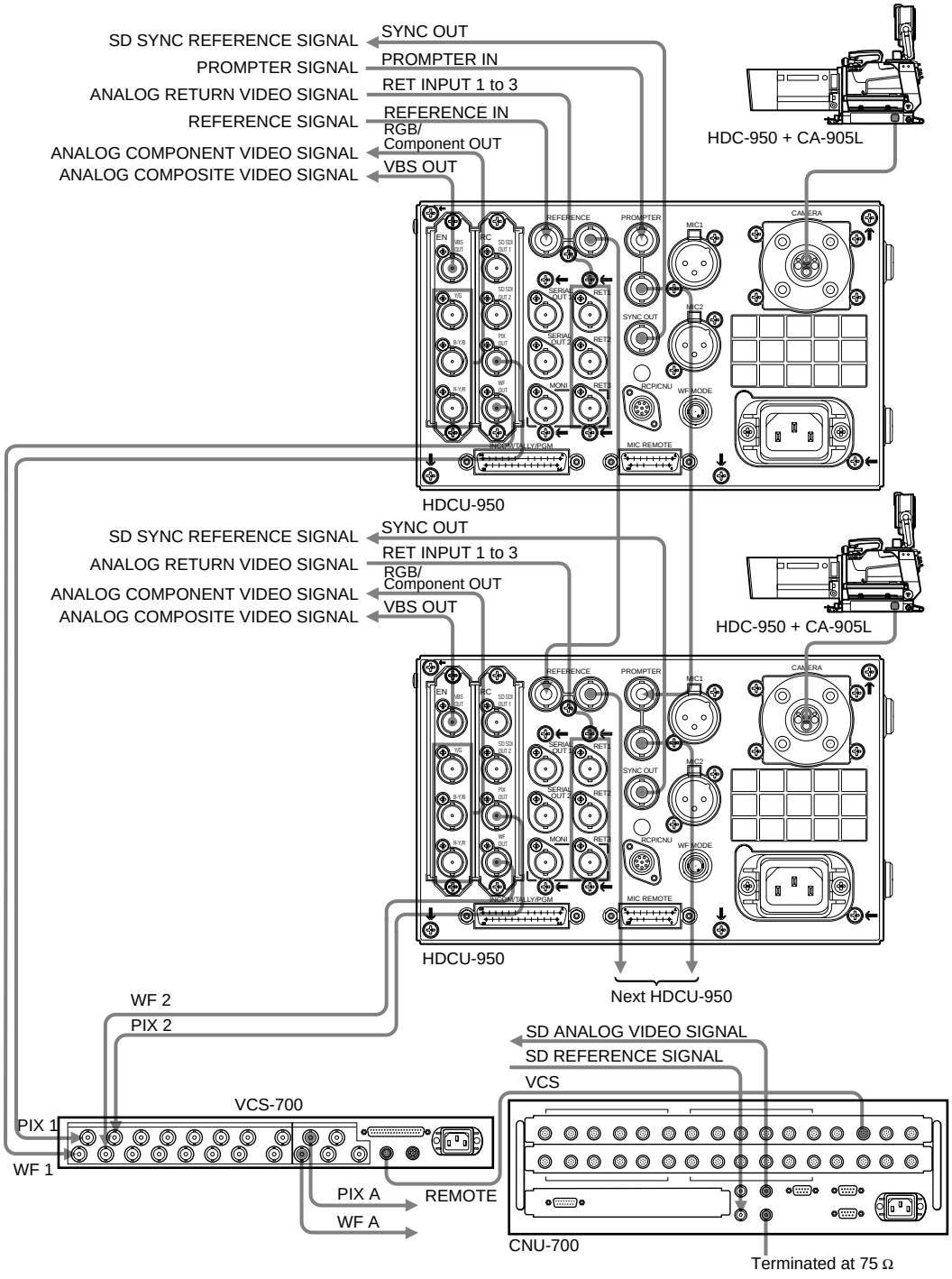
2-7-2-3 HD/SD Film Like System

Figure 2-7-2-2 Example of connection using HDCU-950 (2) - System format: HD/SD film like system



2-7-2-4 Analog NTSC/PAL System

Figure 2-7-2-3 Example of connection using HDCU-950 (3) - System format: Analog NTSC/PAL system



2-8. Rack Mounting of System Equipment

19-inch size equipment

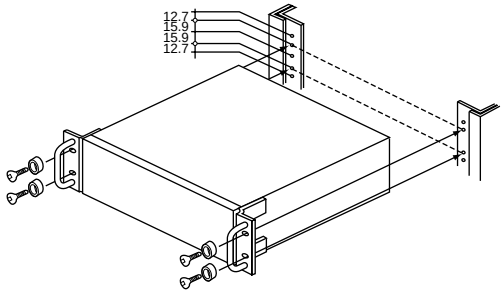
The HDCU-900 Camera Control Unit, CNU-700 and CNU-500 Camera Command Network Units, and VCS-700 Video Selector can be mounted in a 19-inch standard EIA rack. These units either mount directly into the rack or with optional slide rails such as the Sony RMM-30 Rack Mount Rail. These slide rails allow the unit to be easily pulled out from the rack and are recommended if you intended to pull out the unit frequently.

Warning for Safety Purpose: *It takes two or more people to mount a unit into a rack. Mounting the unit into a rack by yourself can cause back or other injuries.*

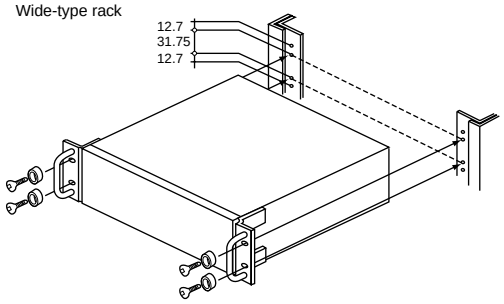
Mounting the unit directly to the rack

Fix the unit to the rack using the rack mount bracket of the unit. Daily maintenance is easy with the unit mounted with this method.

Universal-type rack



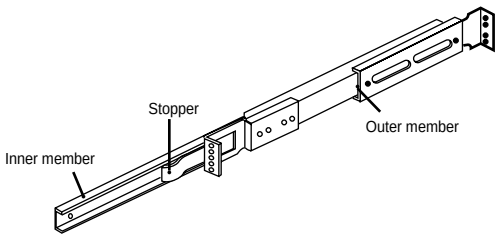
Wide-type rack



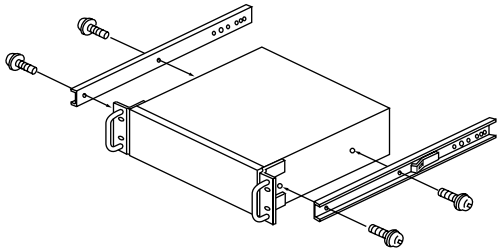
Mounting the unit using the RMM-30 Rack Mount Rail

When the RMM-30 Rack Mount Rail is used, the unit can be mounted into a rack with a depth of 660 to 830 mm (26 to 32 3/4 inches). Proceed as follows:

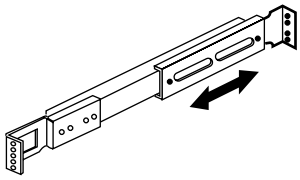
1. Pull out inner member while pushing against the stopper.



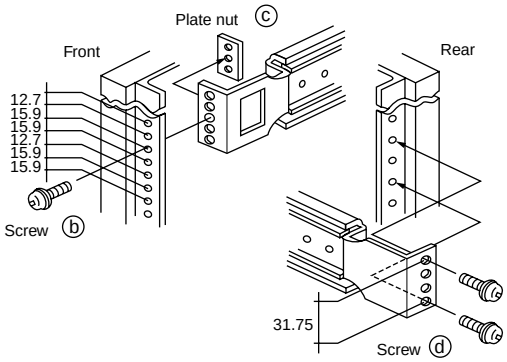
2. Secure the inner members to both sides of the unit with the screws (+B4 x 8). Use the screws removed from or supplied with the unit.

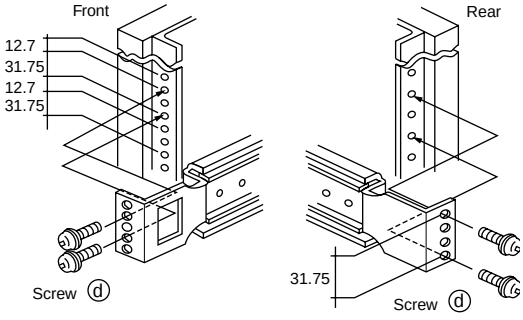


3. Loosen the screw of the bracket of the outer member.



4. Attach the front and rear brackets of the outer member to the rack. Screws (b), (c) and (d) are supplied with the RMM-30.





When a 1U unit is mounted

(1) Attach the front bracket to the inside of the front of the rack at the screw holes at 15.9 mm (22/32 inch) intervals, using screw (b) and plate nut (c).

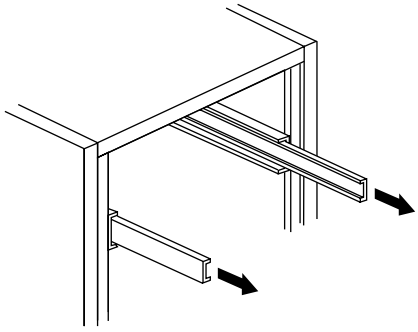
(2) Attach the rear bracket to the outside of the rear of the rack at the screw holes at 31.75 mm (1 5/16 inches) intervals, using screws (d).

When a unit other than 1U height is mounted

(1) Attach the front bracket to the outside of the front of the rack at the screw holes at 31.75 mm intervals, using screws (d).

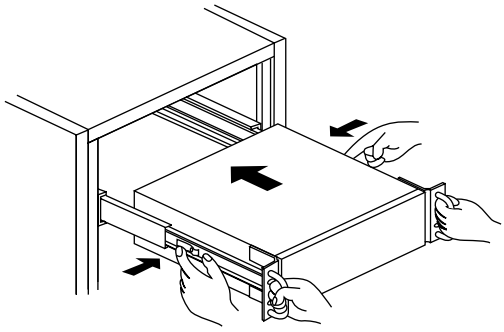
(2) Attach the rear bracket to the outside of the rear of the rack at the screw holes at 31.75 mm intervals, using screws (d).

5. Fasten the screws loosened in step 3.
6. Pull the rails out.

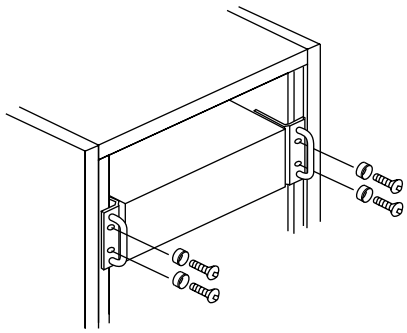


7. Insert the inner member to the outer member while pushing against the stopper, and then fully push the unit into the rack.

Warning for Safety Purpose: *It takes two or more people to mount a unit into a rack. Mounting the unit into a rack by yourself can cause back or other injuries.*



8. Push the unit into the rack, and secure the front panel to the rack with screws (+RK M5 x 16 to 20) and washers (ϕ 5).

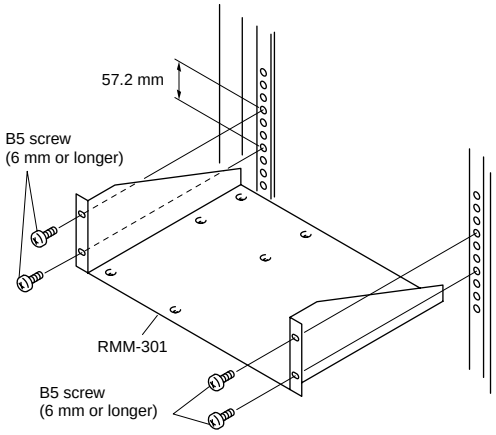


HDCU-950

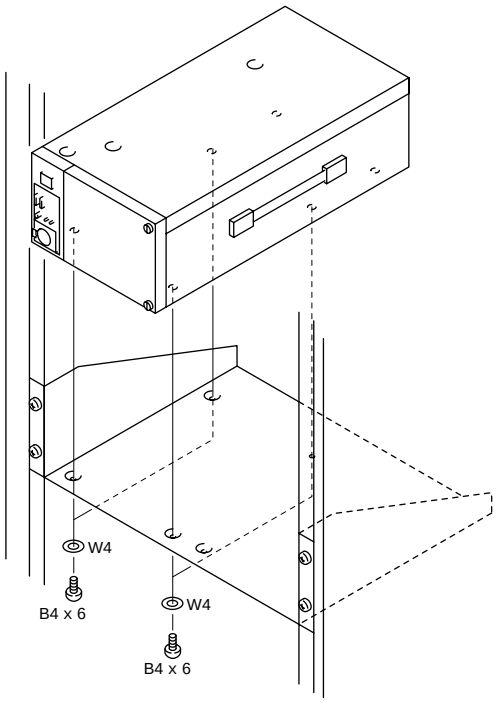
The two HDCU-950 can be mounted in parallel in a 19-inch EIA standard rack by using the rack mount adapter RMM-301 (optional). (Three-unit height)

Installation

1. Secure the RMM-301 in the 19-inch EIA standard rack with the four B5 screws (6 mm or longer).



2. Secure the unit with the supplied four screws (B4 x 6) and the four washers.



Warning

- If the rack falls due to the weight of the equipment, it may cause death or major injury. To prevent the rack from falling or moving, be sure to fix the rack to the floor.
- If the rack falls, death or serious injury may result. When attaching the unit, be sure to fix the rack to the floor and be careful not to attach at a height of 1.2 m or higher from the floor.

Caution

- Use the specified rack mount adapter. If not, injury could occur by drop of the unit because strength of the shelf board is not enough.
- Mount the unit with more than two persons. A one-man job may cause injury.
- Be careful not to catch your finger or hand in the rack mount rail.
- Mount in the rack in a stable position. Injury could occur by drop of the unit in unbalance condition of

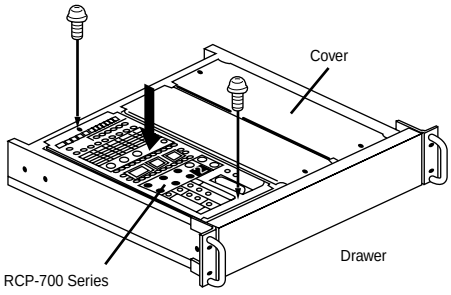
installation or removal. Install in a posture of stability and carefully.

Required Parts

- Rack mount adapter RMM-301 1 set
- Screw (B4 x 6) (supplied with the RMM-301) 4 pcs
 Sony part No.: 7-682-560-04
- Washer (W4, SMALL) (supplied with the RMM-301) 4 pcs
 Sony part No.: 7-688-004-03
- B5 screw (6 mm or longer) 4 pcs

RCP-700 Series and MSU-700 Series

The RCP-750/751/700/701 and the MSU-700A/750 can be mounted into a 19-inch rack using an optional drawer. Each type of equipment requires different parts to mount it into the drawer.





3 Benefit of Sony ADSP (Advanced Digital Signal Processing)

3-1. Full DSP Camera Processing

The HDC-900 Series uses 12-bit A/D conversion based on the latest LSI technology. This advanced technology has allowed Sony to take a major step forward from the 10-bit conversion of its previous generation of cameras - a move that was not possible with earlier A/D converters and DSP LSIs.

(1) Multi Matrix

Multi Matrix is a function that electronically adjusts the basic RGB color 'taking characteristics' of the camera to achieve optimum colorimetry. It makes it easy to match the color of cameras under multi-camera operations, or to reproduce the characteristics of another type of camera. It can also be used to manipulate color for a particular special effect. A conventional linear matrix function provides only six adjustable parameters, with considerable interaction between their effects on a specific color. Multi Matrix divides the spectrum into 16 segments, each of 22.5 degrees, for each of which there is an independent hue and saturation parameter. Multi Matrix allows the selection of each of these segments, with separate adjustment of hue and saturation parameters. Operation flow is as follows:

1. Select Multi Matrix on the paint menu of the MSU-700A/750 Master Set-up Unit.
2. Turn the Matrix and the Multi switches to ON.
3. The MSU-700A/750 EL display now shows a representation of the Multi Matrix as it would appear on a vectorscope. You can select the desired color phase that you want to adjust.
4. After selection of the color phase, its hue and saturation can be adjusted.

Figure 3-1: Multi Matrix

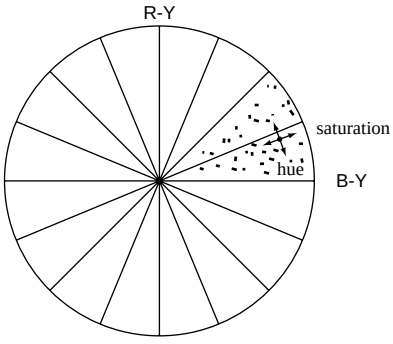


Photo 3-1: Multi Matrix ON and OFF



Normal



On

Photo 3-2: Multi Matrix *(Vectorscope)*



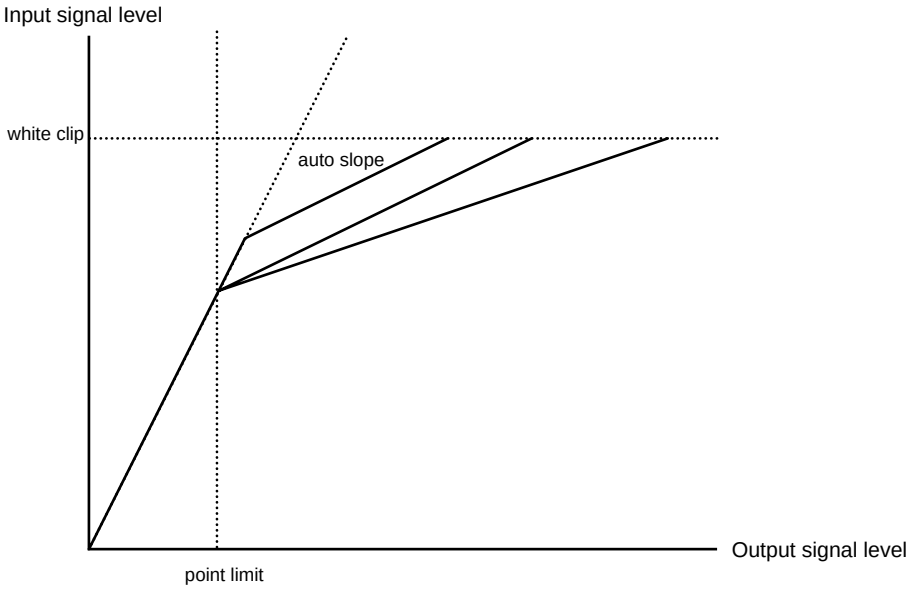
Normal



ON

(2) Auto Knee
When the Auto Knee button on the MSU or RCP panel is pressed, it optimizes the knee point and knee slope for best reproduction of the high lights. The Adaptive Highlight control function can also be used in conjunction with Auto Knee.

Figure 3-2: Auto Knee curve image



auto knee circuit

(3) Gamma
New 12-bit A/D conversion more precisely defines the required gamma characteristic by using a gamma curve created from 48 segments. This is in comparison with the 32 segments in the previous camera range.

(4) Black Gamma
Black Gamma allows control of the linear part of the gamma characteristic, providing adjustment of the shadow areas of the picture during shooting.
Also, the Black Gamma range can be adjusted depending upon the situation.

(5) Black Clip
Improvements in the Black Clip circuitry have improved the signal/noise ratio for more natural reproduction.

(6) Auto Black/White
The HDC-900 Series provides superb accuracy in black and white balance.

3-2. Precise Handling of Highlight Position

(1) Optimized bit assignment
Highlights are compressed by a pre-knee circuit before A/D conversion, providing the most efficient utilization of the 12-bit A/D conversion process.

(2) Knee saturation
Knee Saturation eliminates both the 'washed out' effect and hue changes in overexposed areas of a picture, providing more natural color reproduction.

Photo 3-3: Knee saturation ON and OFF



Normal



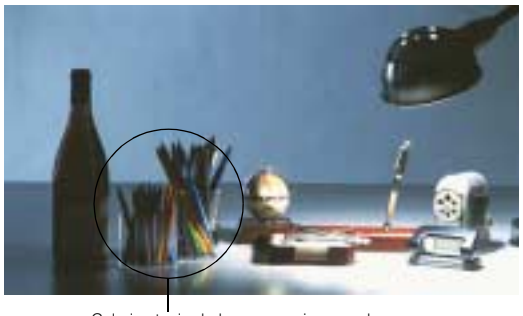
On

(3) Low key saturation
With conventional cameras, low light areas can be subject to a reduction in saturation. This can result in color in these areas being "washed out". The Low Key Saturation function on the HDC-900 Series eliminates this problem by optimizing the amplification of color saturation at low light levels, providing more natural color reproduction.

Photo 3-4: Low key saturation ON and OFF



Normal



On

Colorimetry in dark areas are improved.

(4) Adaptive highlight control (Auto Knee mode)
Conventional cameras only have a single knee point/slope characteristic. In contrast, the Sony ADSP system has multiple knee point/slope characteristics. The camera monitors the brightness of all areas of the picture and adapts the knee point/slope for optimum reproduction. A typical example is shooting an interior scene which includes a sunlit exterior seen through a window. This new function applies only to video levels in excess of the knee point, the middle and low luminance parts remaining unchanged.

Figure 3-3: Knee curve image

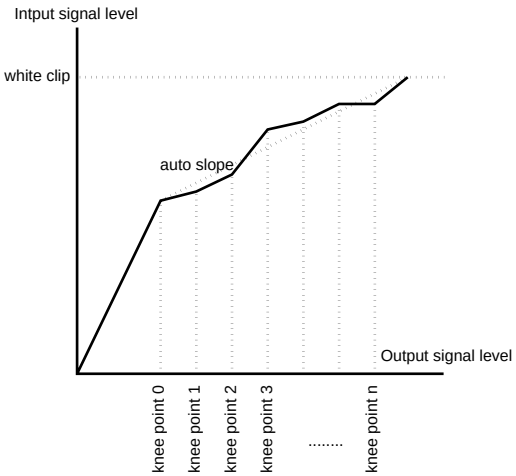


Photo 3-5: Adaptive highlight control ON and OFF



Normal (Olympic Stadium of Barcelona)



On (Olympic Stadium of Barcelona)

(5) Triple Skin Tone Detail Correction
Skin Tone Detail Correction controls the detail level of those objects which have specific color tones. The HDC-900 Series allows detail to be set independently for each of three separate color ranges. Colors are not limited to skin tones, but can be set for any color. Detail may be increased or decreased relative to the normal level.

Phase: Sets the color phase for which Skin Tone Detail Correction is activated.
Width: Sets the color width for which Skin Tone Detail Correction is activated.
Saturation: Sets the saturation for which Skin Tone Detail Correction is activated.

Figure 3-4: Skin Tone Detail Correction

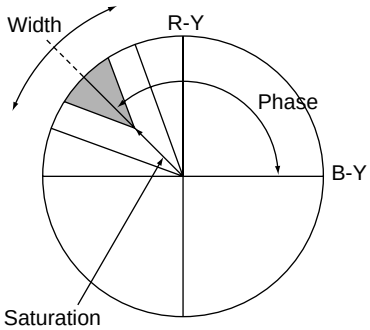


Photo 3-6: Triple Skin Tone Detail Correction ON and OFF



Normal



CH-2 On

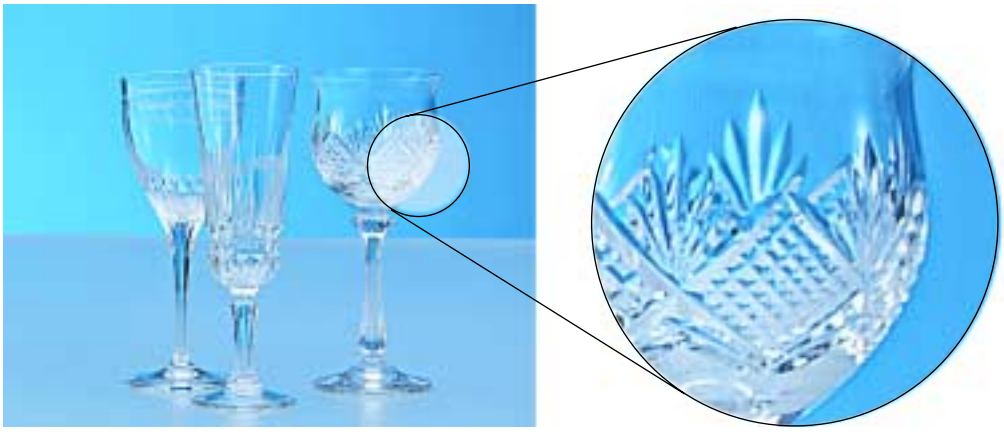


CH-1 On

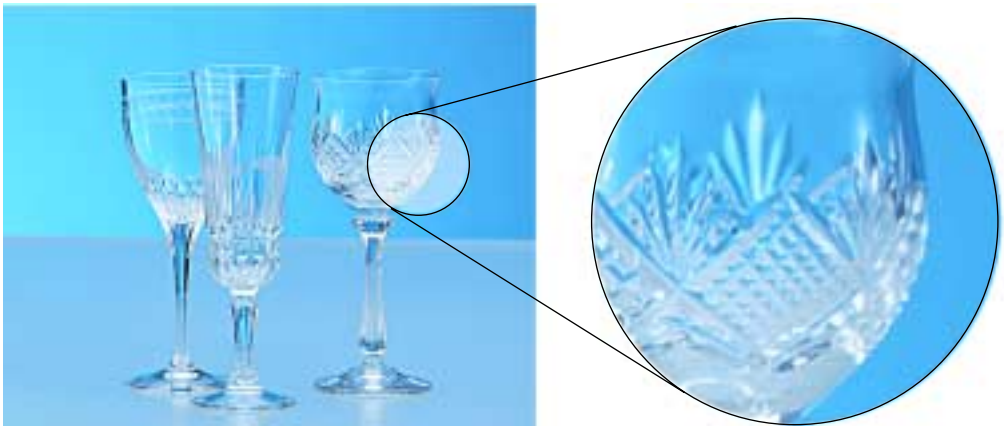
(6) Adaptive Detail Control

The Adaptive Detail Control provides natural detail enhancement on extreme highlights by automatically altering the amplitude of the edge signal for those forms of high contrast signals.

Photo 3-7: Adaptive Detail Control ON and OFF



Normal



On

The black edges are removed.

(7) Electronic Soft Focus
This function is similar to an optical soft filter. By subtracting the edge enhancement signal from the original video signal, slight 'defocused' pictures are created electronically. This is an important new creative feature that can be used to either complement or replace the Skin Tone Detail Correction function, when more of a 'film look' is sought for close-ups, etc.

Figure 3-5: Electronic Soft Focus signal image

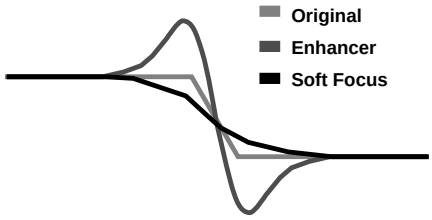


Photo 3-8: Electronic Soft Focus ON and OFF



Normal



Electronic Soft Focus On (Softer than with Detail Off)



Detail Off

3-3. Outstanding reliability and easy maintenance

One of the most important concerns for broadcasters is the reliability of equipment. This is considerably improved with Sony digital processing. In Sony ADSP cameras, all the processing parameters are completely and precisely defined at the design stage, and almost all the potentiometers are replaced by semiconductor memories. Consequently, Sony ADSP cameras show extremely stable performance, regardless of environmental conditions such as temperature, humidity, shock and vibration. This high stability, together with the advantages of the self-contained menu system, enables easy and accurate set-up of camera systems for regular realignment. Finally, a great benefit of Sony ADSP cameras is their advanced self-diagnostic system. HDC-900 Series cameras detect problems in their digital processing and provide a viewfinder warning indication. Detailed information, such as identifying the faulty board, is also shown on the Master Set-up Unit screen and the Camera Command Network Unit character display to provide easy and rapid fault location.

3-4. Low power consumption

To achieve its design aim of complete digital processing, including digital implementation of the nonlinear processing stages, Sony has developed VLSIs which contain over 1,600,000 actual gates. This complexity demonstrates the advances that Sony has made in the application of its semiconductor technology. Despite this complexity, Sony ADSP cameras approach the same low power consumption as previous analog/digital portable cameras. This has been made possible by using the Sony EDA (Electronic Design Automation) system to optimize the complex camera circuitry in a short time scale and to incorporate the latest LSI technologies (2.5 V drive and 0.35 µm design rule) to give a total power consumption of just 25 W for the HDC-950 portable HD camera (in stand-alone use without options).



4 Control System

4-1. Sony Camera Command Network System

Several decades of TV operations have led to the development of many alternative operational and engineering philosophies relating to the deployment of video and technical control and to the monitoring and routine maintenance of multi-camera studio and OB truck installations. Sony has re-examined the entire studio camera architecture with the goal of structuring a far higher degree of system flexibility. This new architecture is based on:

- High-speed communication of digital control commands
- A considerably augmented Master Set-up Unit, the MSU-700A/750
- The introduction of a powerful technical 'nerve center' concept - the camera Command Network Units, CNU-700 and CNU-500
- Electronically assignable camera remote control panels for use with these camera command network units

4-2. Master Set-up Unit – MSU-700A/750

The Master Set-up Unit (MSU) is the centralized technical control position for multi-camera systems. The MSU-700A/750 has been designed to provide comprehensive and wide ranging technical supervision and alignment of a complex camera system from a single centralized panel. If it is desirable in a large program origination complex to extend this supervision to more than one control location (for example, separate operational and engineering/ maintenance control centers) then a number of MSU-700A/750 units can access the entire camera system. To exercise maximum flexibility in controlling a multi-camera system, the MSU-700A/750 is designed to work in conjunction with the CNU-700 and CNU-500 Command Network Units. However, if a simplified system is desired, the MSU-700A/750 can also operate as a stand-alone unit. It provides rapid, finger-tip access to all controls relating to the smooth functioning of an operational system, including:

- Technical alignment controls for the entire camera chain
- Picture and waveform monitor switching
- System configuration
- Control data filing

Extended Technical Access to Camera Video Processing

A traditional high-end studio/OB camera chain entails a multiplicity of technical adjustments. In combination they optimize of the technical alignment of the RGB video processing channels and allow a broad degree of control over certain critical video subsystems (such as image enhancement, color reproduction, dynamic range, etc.). Typically, these technical controls are segregated into those requiring regular operational access - and are provided as remote adjustments on video operational panels or technical control panels - and others, perhaps requiring less frequent access, which are relegated to screwdriver adjustments on various circuit boards within the camera head and HDCU. This separation often entailed a degree of protracted (and frustrating) re-alignment when subtle creative readjustments are desired for a particular picture composition.

In the HDC-900 Series camera system, Sony has adopted the philosophy that all technical controls are important and that remote access to virtually all controls on a single control panel would bring higher operational efficiency. This led to the introduction of the MSU-700A/750 Master Set-up Unit. To avoid undue complication of the ergonomics of the panel layout that would result from such extensive access, a novel Electro Luminescent (EL) sub-panel forms an integral part of the overall MSU-700A/750 control panel - Photo 4-1. This menu-driven touch screen allows remote pre-programmed and logical access to dozens of technical adjustments. Perhaps no other system can better illustrate the enhanced degree of centralized control than that relating to access to the many adjustments required for the image enhancement system. Depending upon the creative desires of the program director, the MSU-700A/750 allows highly flexible, finger-tip access to all critical adjustments, including skin detail control.

The main features of the MSU-700A/750 are given below.

(1) Easy operation

- Frequently used functions are directly accessed from the panel.
- The following modes can be easily accessed by using the new EL touch panel display for maintenance and daily operation.
- **Paint mode:** Various paint items such as White, Black and Flare are adjustable
- **File mode:** Storing, retrieving and transferring reference files, lens files and scene files between camera heads on a PC memory card
- **Maintenance mode:** System phase control, HDCU video level alignment, selection of character display from a CNU-700 and CNU-500, etc.
- **Configuration mode:** Entire control system configuration, RCP assignment, etc.
- **Card mode:** PC memory card initialize, store to PC memory card/recall from PC memory card, etc.
- **Multi-mode:** Setting of multi-camera operation such as 'All', 'Control Priority', 'Parallel Mode', etc.

(2) Multi-MSU operation

In a conventional system, a single MSU controls a single studio or multiple studios. However, in this new control system, multiple MSUs can be used to remotely control/supervise a single studio from different operational engineering and control rooms.

(3) Standard switch

Users standard setting data is easily recalled by pressing the 'standard' switch.

Photo 4-1: MSU-700A Master Set-up Unit



4-3. Camera Command Network Units – CNU-700 and CNU-500

The CNU-700 and CNU-500 Camera Command Network Units are designed as the technical 'nerve center' of a Star Shape Network System where all commands such as 'All', 'Control Priority', 'Parallel/ Mode', etc. are centralized and distributed to the respective HDCUs of the studio system. They are furnished with an RS-232C port to provide interface capability to external systems such as ISR (Interactive Status Reporting), external PC or modem and robotics control systems. They can be mounted in a 19-inch standard rack (3U height for the CNU-700, and 1U height for the CNU-500). Through the modem or PC, camera data files can be transferred from a master camera in a studio to cameras at several remote sites during a live broadcast.

By employing a RISC-based microprocessor in the CNU-700 and CNU-500, the communication speed has been greatly improved. Consequently, real-time control and instant response to the MSU-700A/750 or RCP-700 Series commands have been made possible. With the combination of one VCS-700 Video Selector with a CNU-700 or CNU-500, each of six pictures and six waveform monitoring video signals can be handled (and expanded to 96 of each with eight CNU-700 units).

Through a CNU-700 or CNU-500, one RCP can control one HDCU while one MSU is able to control multiple HDCUs. All units connected to the CNU can easily communicate with each other. Because of this useful new -function, simultaneous control of multi cameras, file transfer between multi cameras and control from an external device are now possible.

As a convenient tool for system set-up and maintenance, both MSU control routing and CNU control assignment can be displayed on a monitor.

Since the CNU is the nerve center of a system, it has a bypass facility to maintain communication between the HDCUs and RCPs in the event of a CNU malfunction or power loss. Therefore, even when the power unit or AT board of the CNU-700 or CNU-500 has failed, camera heads and HDCUs can be directly controlled from the RCPs to let program production continue.

As mentioned in Section 2, Total System, the cost versus performance balance between the two types of Camera Command Network Units allows users to build up systems that meet their application needs. The CNU-500 is suitable for applications with up to six cameras, while the CNU-700 can be expanded to handle up to 12 cameras with use of the BKP-7930 optional expansion board.

(1) High-speed data transmission rates
CNU to MSU/RCP/HDCU: More than 500 Kbps
Camera Head to HDCU: 35 Kbps

(2) System configuration
Basic system: Up to six cameras with one CNU-700 or CNU-500
Expanded system: Up to 12 cameras with one CNU-700 with one BKP-7930 optional board installed
Maximum system: Up to 96 cameras with eight CNU-700 units (each with a BKP-7930 optional board installed) via I/O port on the rear panel (four MSU-700A/750 Master Set-up Units required).

(3) Character display
Information concerning the camera heads and HDCUs connected to the CNU-700 and CNU-500 can be displayed on a monitor via the CHARACTER connector. This includes:
- Camera settings
- System connection information
- Results of Auto set-up
- Self-diagnostics information

(4) Emergency feature
In the event of a problem with the CNU-700 and CNU-500, turning their internal OPERATION switch to the EMERGENCY position allows control signals from the remote control panel to be directly connected to the camera head. In this way, program production cancontinue by bypassing the CNU.

Table 4-1: A comparison between the CNU-700 and CNU-500

	CNU-700	CNU-500
Number of Cameras connectable	Up to 6 cameras	Up to 6 cameras
	Up to 12 cameras with BKP-7930 fitted	No
	Up to 96 cameras with multi CNU connected	No
Number of RCPs connectable	Up to 6 RCPs	Up to 6 RCPs
	Up to 12 RCPs with BKP-7930 fitted	No
	Up to 96 RCPs with multi CNU connected	No
Multi MSU connectable	Yes	No
Multi VCS connectable	Yes	No
Other controller connectable	Yes	Available with optional AUX connector
Programable with remote control	Yes	No
RS-232C connector for ISR	Yes	Yes
RS-232C connector for switcher etc.	One	No
	Two when BKP-7930 fitted	No
REF. video in	Yes	Yes
Character out	2	1
Assignment between RCP and CHU/CCU	Free	Fixed

	CNU-700	CNU-500
Power supply to RCP	Yes	No (But RCP can be powered from CCU)
Height	3 U	1 U
19-inch standard rack mauntable	Yes	Yes

Figure 4-1: CNU-700/500 Basic System Configurations (Up to six cameras with one CNU-700 or CNU-500)

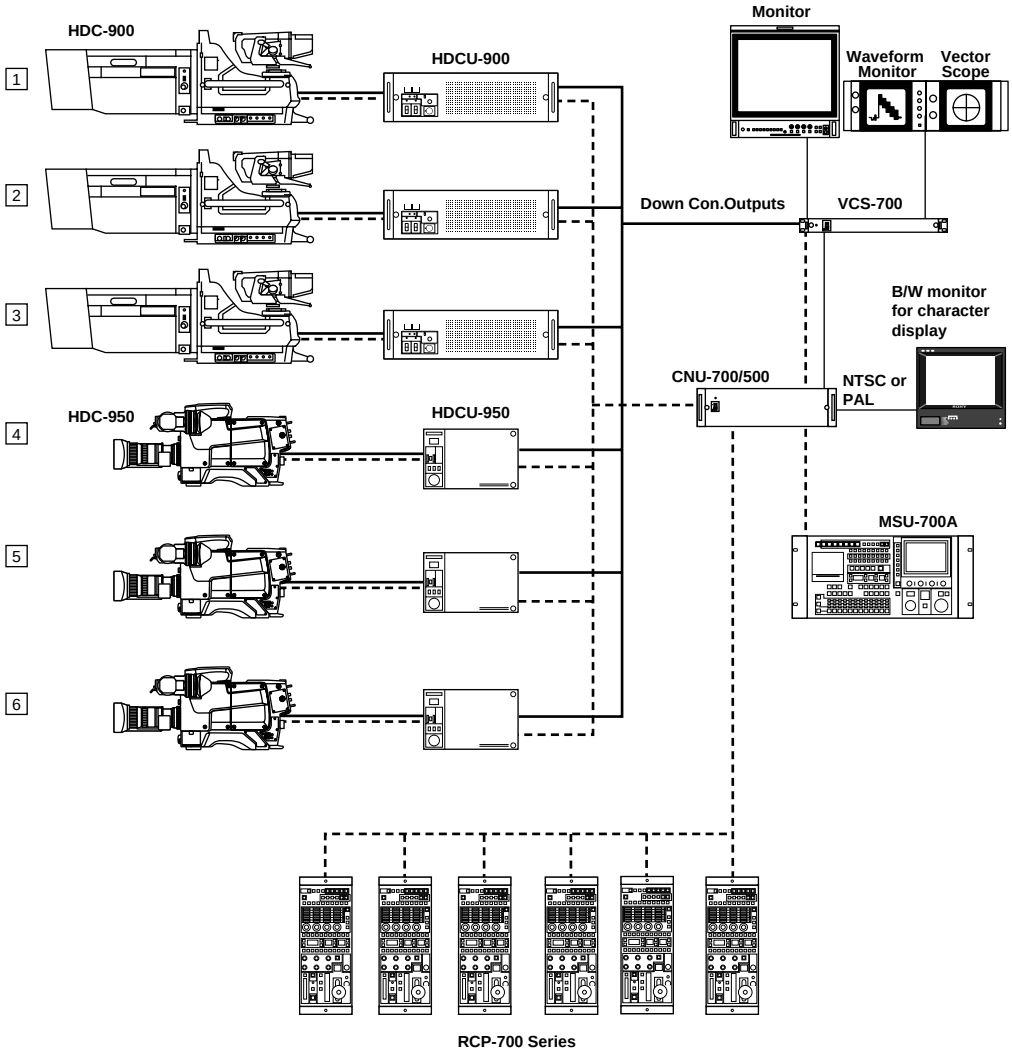


Figure 4-2: CNU-700 Expanded System Configurations (Up to 12 cameras with one CNU-700 with one BKP-7930 installed)

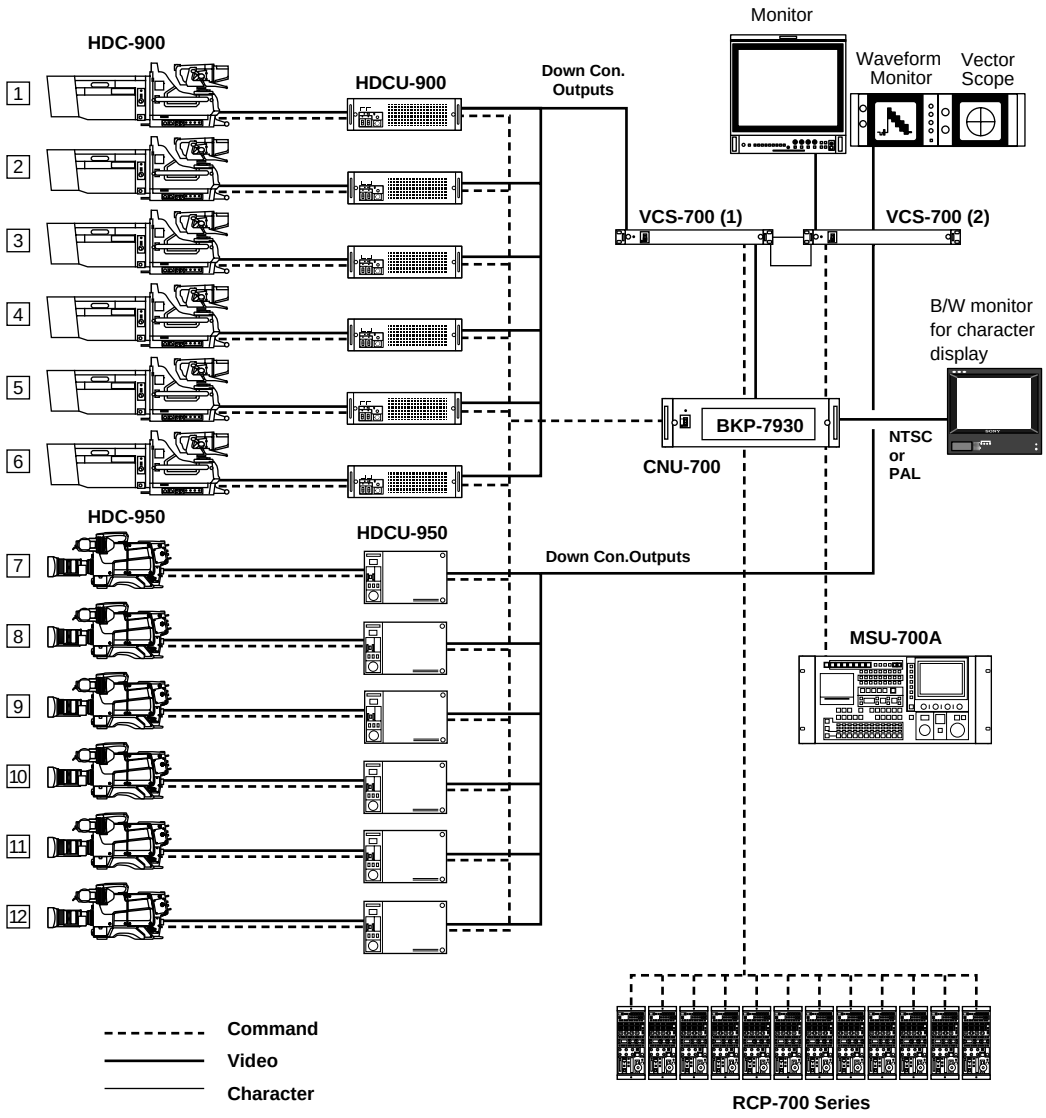
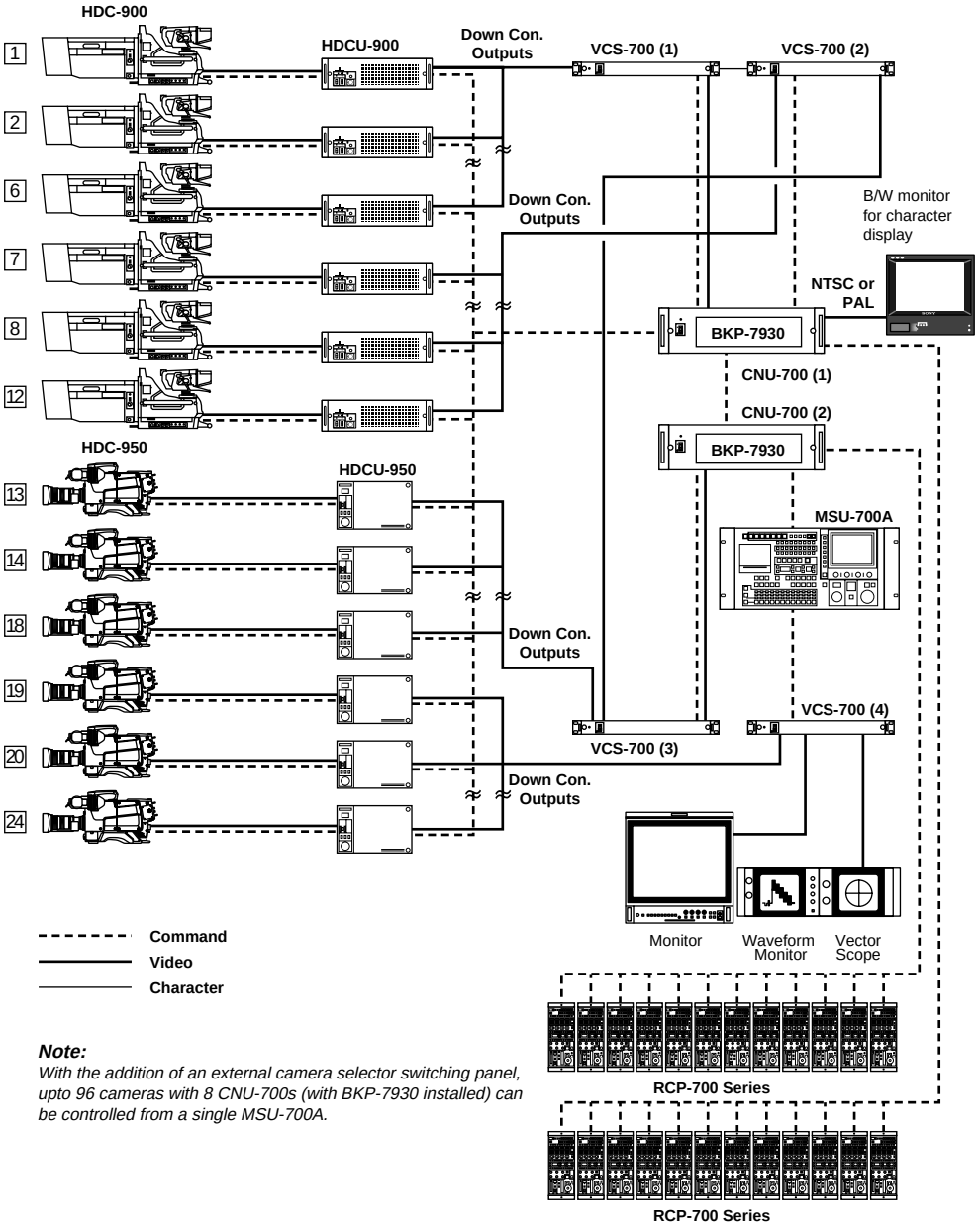


Figure 4-3: CNU-700 Maximum System Configurations (expandable to 96 cameras)



Note:
With the addition of an external camera selector switching panel, upto 96 cameras with 8 CNU-700s (with BKP-7930 installed) can be controlled from a single MSU-700A.

Figure 4-4: Multi-MSU Operation Example (1)

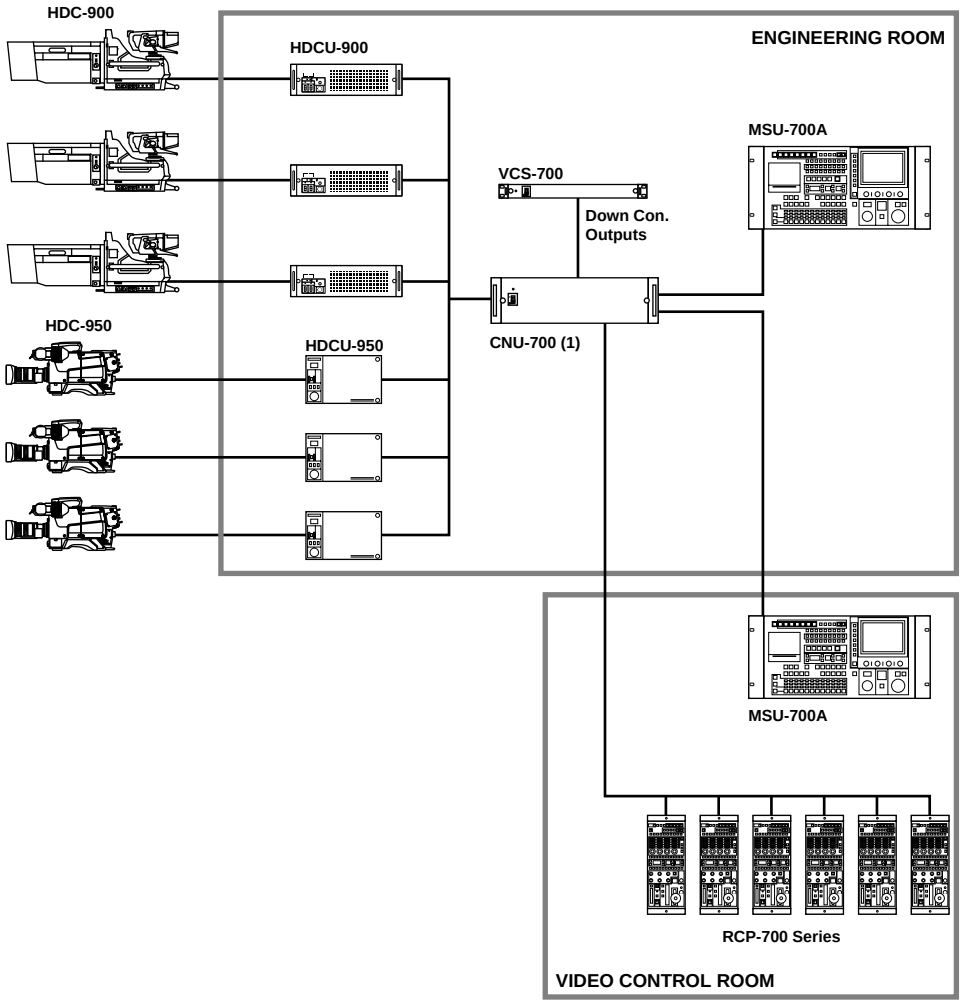
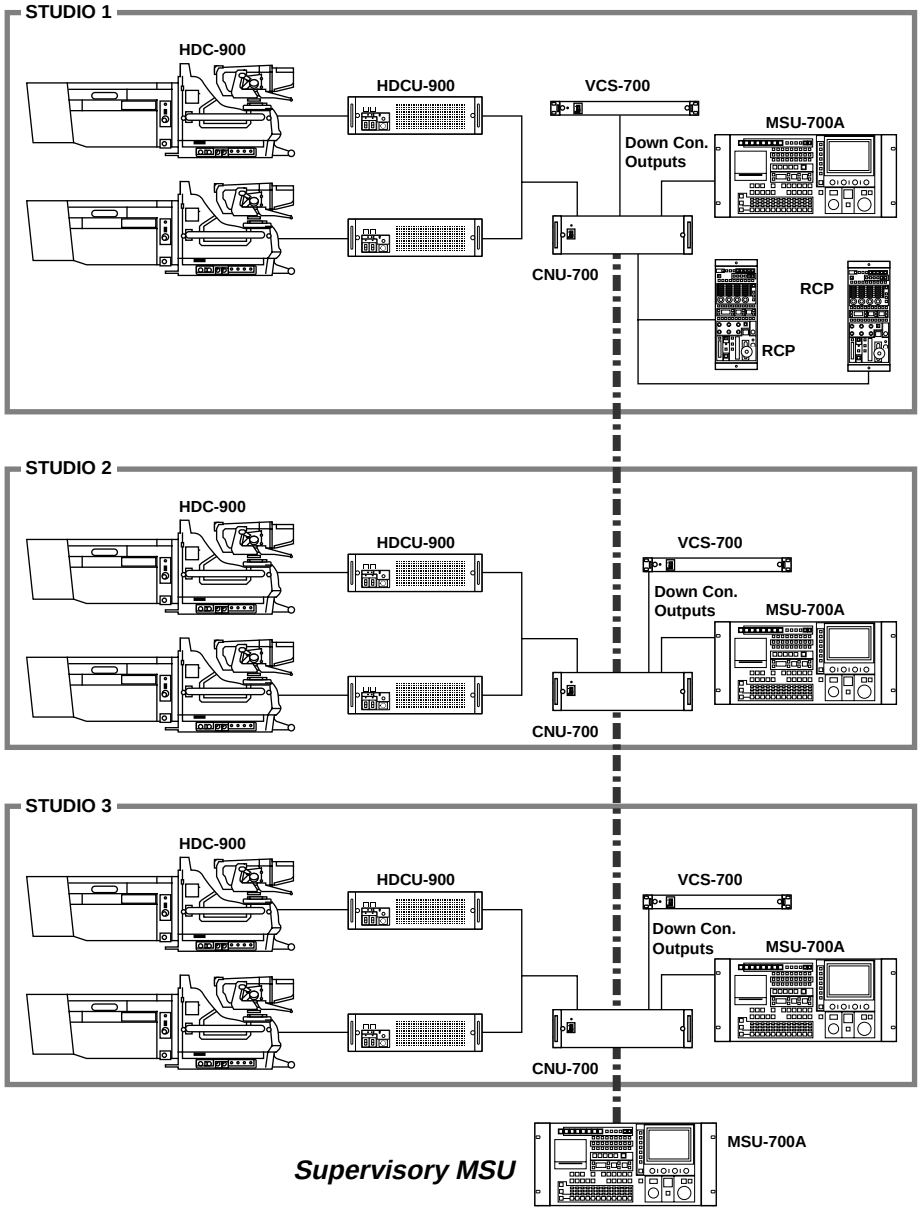


Figure 4-5: Multi-MSU Operation Example (2)

Supervising a complete system with a supervisiory MSU



4-4. New Remote Control Panels - RCP-750/751

The RCP-750/751 Remote Control Panel is newly designed for remote control of the Sony BVP/HDC-Series Color Video Camera via the CCU/HDCU-Series Camera Control Unit. The panel is connected to the CCU/HDCU-Series Camera Control Unit (or the CNU-series Camera Command Network Unit, which is connected to the CCU/HDCU-Series) by a special cable of up to 200 m (656 feet) in length.

The RCP-750 and RCP-751 are completely identical in their functions except with respect to the iris and master black adjustments, for which the RCP-750 uses a joystick type control while the RCP-751 uses rotary knobs.

The RCP-750/751 has the following features:

Optimal control -arrangement for basic camera operation
This remote control panel is provided with essential control functions for basic operation of a BVP/HDC Series camera. The buttons, knobs, and other controls have been arranged according to their functions and with consideration to their frequency of use. Indicators and buttons light or flash to indicate the status of the system operation. Also, guard frames are provided to protect against accidental use of those buttons vital to camera operation. These features ensure easy and error-free use of this remote control panel.

Controlling the automatic setup function
The RCP-750/751 has built-in microcomputers that reliably perform automatic setup for the majority of the control items. The various items can be automatically adjusted independently or in combination.

Controlling the scene file function
Camera adjustment and control data such as paint data for a particular scene can be stored in the video camera in the form of a scene file. The stored data can easily be retrieved at any time to automatically adjust the camera to the shooting conditions for that particular scene. This panel enables up to five scene files to be created and handled.

Controlling the ECS/shutter function of the camera
The ECS (Extended Clear Scan) and electronic shutter functions of the camera can be turned on/off from this panel. The ECS frequency and shutter speed are also selectable.

Signal transmission via a digital line
Between this remote control panel and the camera control unit, signals are digitally transmitted via a single connection cable (CCA-5), ensuring a reliable signal. Operating power is also supplied via the cable.

Memory Stick media card slot
Various data, including scene files and reference files, can be stored on a **Memory Stick** media card and reproduced at any time.

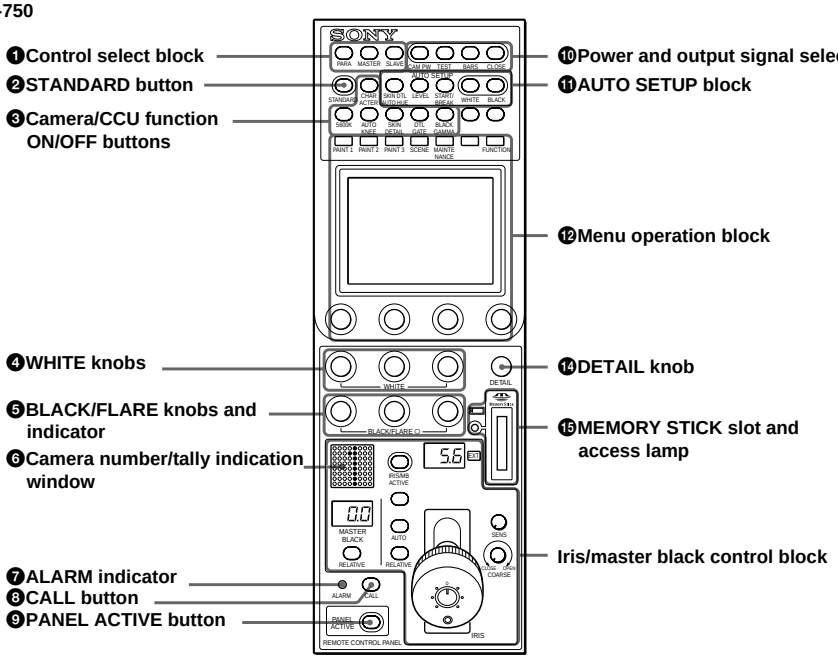
Touch panel with 31/2-inch LCD for various operations
The control panel has a touch panel that permits various items to be selected and adjusted on the LCD in menu format.

Parallel operation with another control panel
Video cameras can be concurrently controlled from this panel and another controller, such as the MSU-700A/750A/750 Master Setup Unit.

Four units mountable on a 19-inch rack
Up to four units of this control panel can be mounted in a line on a 19-inch EIA standard rack.

Figure 4-6: Operation Panel of the RCP-750/751

RCP-750



RCP-751

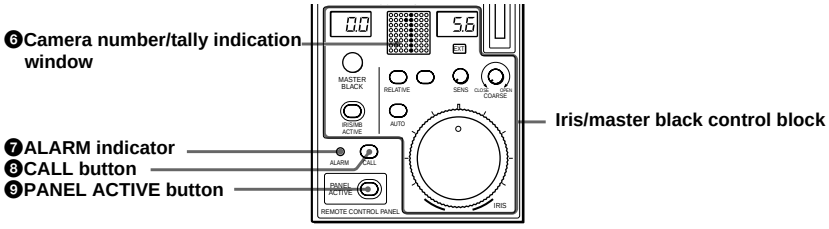
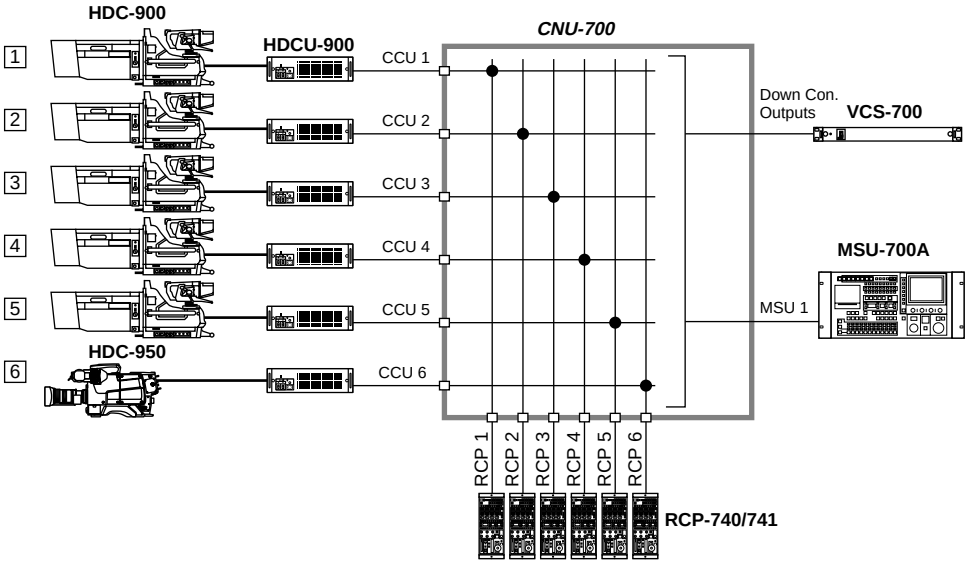


Figure 4-7: Flexible Configuration

Extremely Flexible Configuration

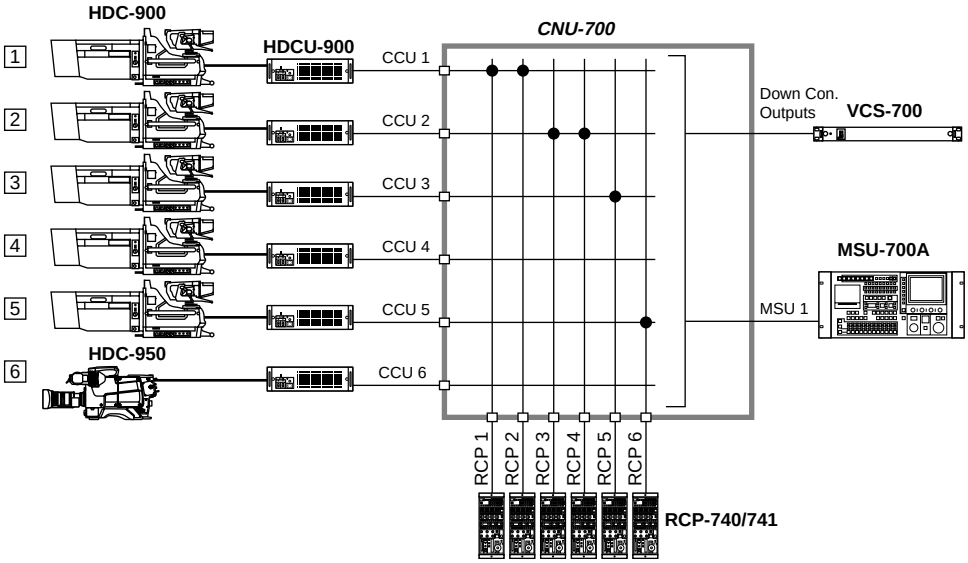
- When ex-factory -

The assignments between CCUs and RCPs are set as below.



- For flexibility, assignments can be easily changed e,g -

CAM 1 controlles from RCP 1&2, CAM 2 controlled from RCP 3&4,
CAM 3 controlles from RCP5, and CAM 5 controlled from RCP 6



4-5. Auto Set-up

The HDC-900 and HDC-950/930 cameras incorporate a sophisticated Auto Setup system to adjust the video processing circuitry parameters for optimum color matching. In addition to auto white balance, auto black balance and auto level set-up, the following parameters can also be adjusted according to a reference file.

- Auto white shading (The shading compensation is achieved with horizontal and vertical sawtooth and parabolic waveform as well as with a digitally synthesized waveform for almost 1000 individual correction zones created by DSP.)
- Skin detail auto hue (automatic hue detection for specified color range, with full skin detail function.)

4-6. Control Priority and Parallel Mode

Control Priority

When a camera system is configured using the CNU-700 or CNU-500, each camera can be connected in parallel to both an RCP-700 Series Remote Control Panel and the MSU-700A/750 Master Setup Unit, and is controlled from whichever unit has control priority. Priority for iris/master black adjustments only can be obtained when the IRIS/MB ACTIVE button on the panel on which the PANEL ACTIVE button is not lit. When the MSU-700A/750 is in the panel active status, only the iris and master black controls are inoperative on the MSU-700A/750 and can be set by pressing the lit IRIS/MB ACTIVE button.

Parallel Mode

The MSU-700A/750 and RCP-700 Series panels have a PARA button to select Parallel Mode. When the PARA button of the unit is pressed and lit, Parallel Mode is activated and all the control functions, other than the iris/master black controls, become operative from both units. The Parallel Mode can be canceled by pressing the PARA button of the MSU-700A/750 or RCP-700 Series control panel.

4-7. S-BUS Control

The S-Bus Concept

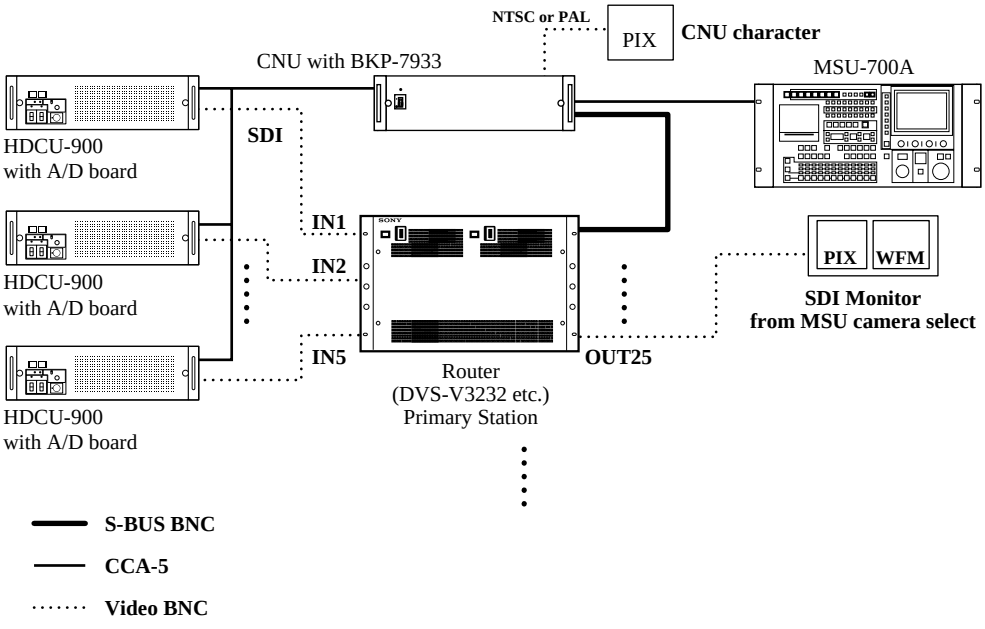
A further advantage of the Sony camera control system is the 'S-Bus control' technique, which is based on an original Sony concept. Studio installations and OB units use digital routers as the nerve center for a complete audio/video system. With Sony system integration, all the equipment is connected to the Sony digital router via a LAN, called the 'S-Bus'. With the S-Bus system, control and tally signals are interlocked so that they, along with video and audio signals, can be simultaneously switched from a central terminal. Each input/output source can be given a name, which can then be displayed on the source name display panel of a DVS-7000/8000 Series Video Switcher or on the BKS-R3280/R3281 Status Character Display. One example of the operational advantages of the S-Bus system is that the routing of input signals to the primary inputs - of a DVS-7000/8000 Series Video Switcher can be changed at any time without having to re-connect cables. Even the source name display, tally signal and tally display are interlocked and changed automatically.

Sony camera command system with S-Bus

Controlling the router from an MSU panel

The digital router's cross point can switched from the MSU-700A/750 by pressing its camera select button. SDI video monitoring is enabled.

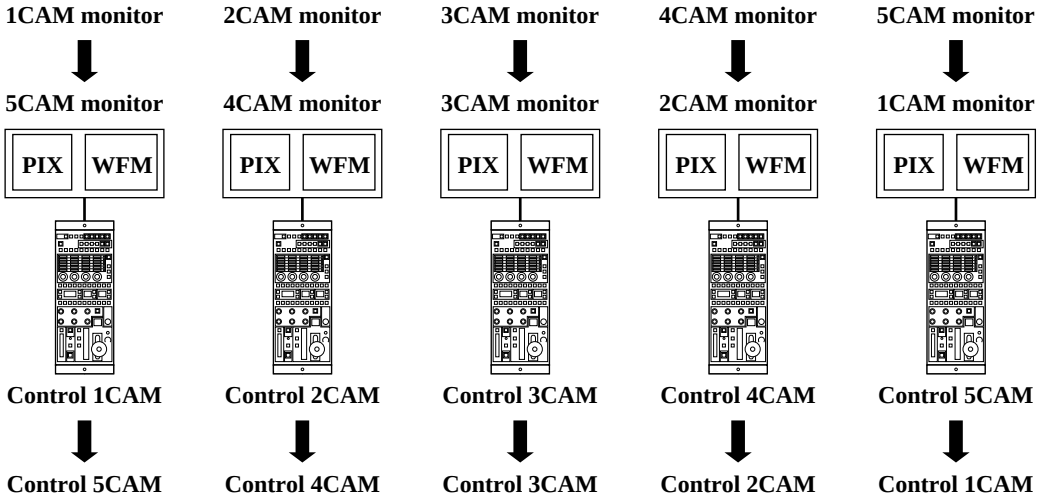
Figure 4-8: Router control from MSU



Interlocking the RCP Assignment and WFM/PIX Assignment

When the assignment of any RCP is changed from the MSU-700A/750, the picture and waveform monitoring is also automatically changed to follow the new arrangement.

Figure 4-9: Interlocking RCP and monitor assignment

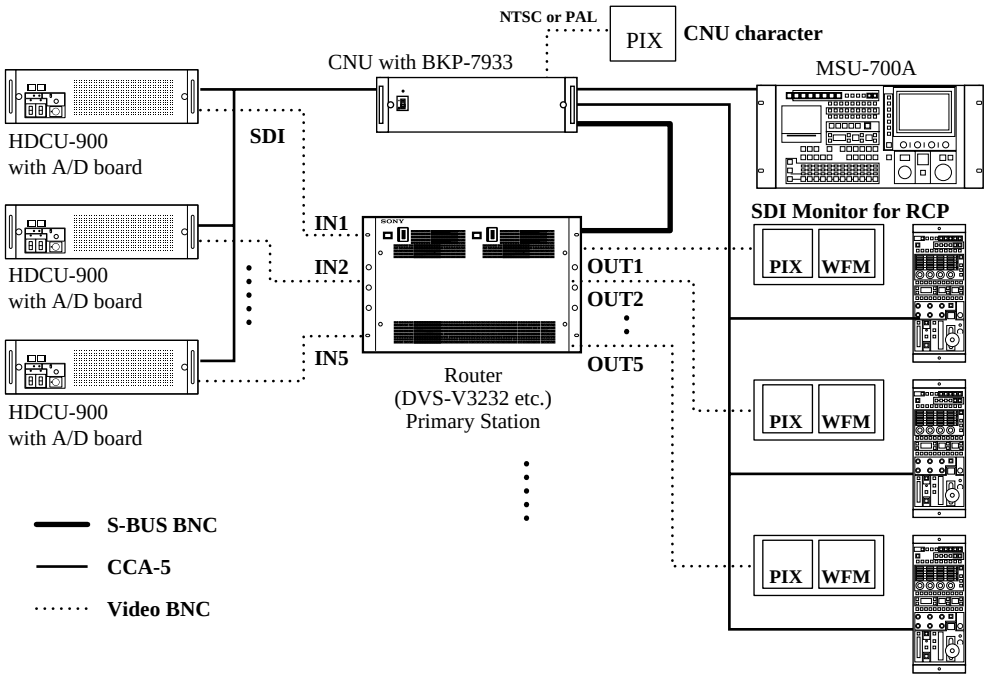


When the RCP assignment is canged, PIX/WFM video is also changed automatically.

Controlling the router from an RCP

Pressing the preview switch on an RCP-700 Series control panel switches the appropriate digital router cross point. SDI video monitoring is enabled.

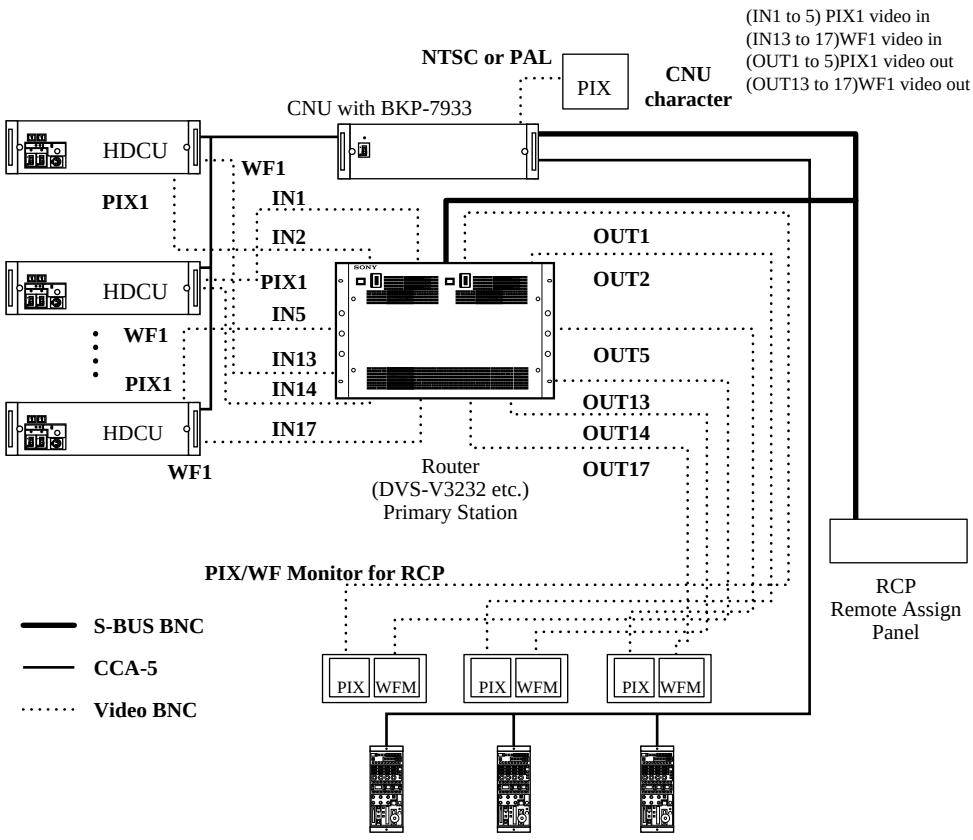
Figure 4-10:Router control from an RCP



Controlling the RCP assignment from other S-Bus equipment

All S-Bus equipment detects the connection configurations between camera heads, HDCUs and RCPs by communicating with each other. This means that other S-Bus equipment can change the assignment of RCPs in a system that does not include an MSU-700A/750

Figure 4-11:Remote control of the RCP assignment without an MSU-700A/750

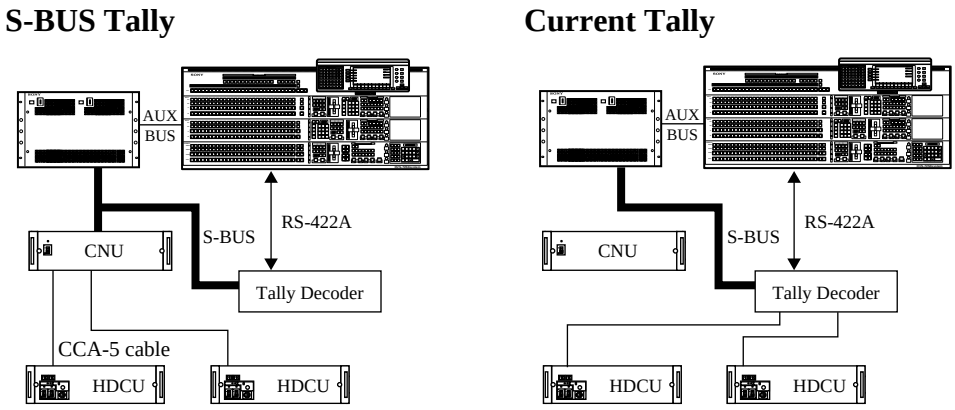


Camera name display onto CNU
Sony uses a PC as the primary control station of a digital router. Each camera can be given a name with this primary PC, and these names are then automatically shown on the CNU character display.

Serial Tally Transfer
Decodes S-Bus serial tally signal and forward to HDCU.

A CNU-700 requires a BKP-7933 option for S-Bus functionality.

Figure 4-12:Current tally and S-Bus tally





5 Optical Fiber Connector and Cable

5-1. Optical Fiber Overview

In order to secure the High Definition signal transmission between the HDCU-900/950 to an HDC-900 or HDC-950/930 with a much longer distance compared with the conventional Triax cable, the SMPTE standard optical fiber connector and cable have been adopted. The connecting cable uses two single-mode optical fiber lines, two control lines, and two power lines to carry digitized video, audio, control signals and power to the camera. As a result, an extremely high-quality, all-digital bi-directional video and audio signal can be transmitted up to a distance of 3 km (1.86 miles)* with the HDCU-900 and 1.2 km (0.75 miles)* with the HDCU-950. To maintain this high performance, an appropriate cleaning is recommended to carry out periodically.

** When supplying power to the camera via the optical fiber cable, the maximum cable length varies with the camera system configuration and lens type, the size of the optical fiber cable and the number of cable connectors.*

5-2. Cleaning of the Connector and Cable

It is recommended to clean the optical contact portions mentioned below before connecting this unit to the camera control unit.
- CCU connector of this unit
- Camera connector of the camera control unit
- Optical/Electrical cable

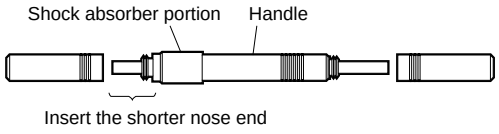
It is also necessary to clean the optical contact portions mentioned below before using the HDC-950/930 with the large lens adaptor CA-905L.
- CA cable of a large lens adaptor
- CCU connector of a large lens adaptor

Follow the procedures below for cleaning.

Tools Required

- Alignment sleeve remover HC-001 (for female connector)
 Sony P/N: J-6480-010-A

Note
Insert the shorter nose end when removing/installing the alignment sleeve.
Grasp the handle, not the shock absorber.

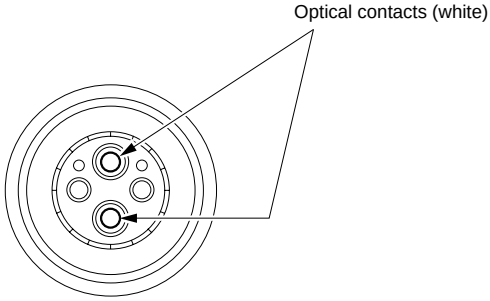


- Cotton swabs (commercially available)

Note
Use the cotton swab with a diameter of around 4 mm. The cotton swab with a diameter more than 5 mm does not reach far enough in to the inner part of the cable, to clean the tip of the optical contact.

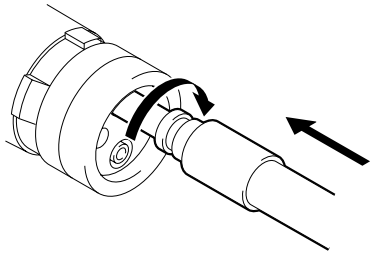
Cleaning

Male connector
Clean the tip of the white optical contacts with a cotton swab moistened with alcohol.



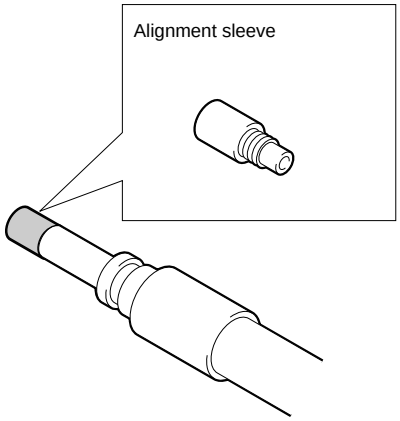
Female connector
The optical contacts for the female connector are in an unexposed area. When cleaning, it is necessary to - expose the contacts by first removing the alignment sleeve. Proceed as follows.

1. Insert the alignment sleeve remover into the alignment sleeve in a straight line and turn it clockwise.

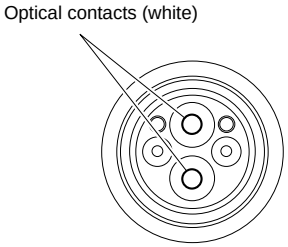


2. When the turning stops, forcedly pull out the remover in the straight line.
 Note
 The alignment sleeve can be removed/reinstalled with the sleeve itself attached to the tip of the remover.

Great care should be taken so as not to lose or damage the alignment sleeve.
(Alignment sleeve: Sony P/N 9-980-074-01)



3. Clean the tip of the white optical contacts with a cotton swab moistened with alcohol.



4. Insert the remover with the alignment sleeve attached to its tip, and push it until it clicks.
5. Rotate the remover counterclockwise to install the alignment sleeve, and extract the remover.



6 A Quick Lesson on Camera Settings

The following are two quick setting guides for the HDC-900 Series: Case-1 and Case-2. The former is mainly for applications where minimal camera operational experience is required or for unmanned, robotic control operations. The latter is for general operations.

6-1. Case 1 — for situations requiring minimal camera operator experience

1. One-touch power on
Use the main switch of the power supply to turn on/off the whole system rather than using the power on/off switches on the individual devices for operating convenience.

2. Stable time
Normally, a camera system can be used to start shooting within a few seconds after power is turned on. If the camera is connected in a large system environment, it may require a little more time especially for System Locking after the power is turned on. System components that need continual system stability, such as a sync-generator, should be in round-the-clock operation in case it is needed to respond to an emergency broadcasting condition.

3. Setup
Store all the data for standard camera status on a Reference file so the camera system can be operated under a standard condition previously set just by pressing the Standard button.

4. Scene files
Recall desired scene files that will be used. It is very efficient to use the scene files for patternized weather forecasts or special corner inserts in news programs.

5. End
Just turn off the main switch of the power supply.

Notes
- Prepare reference files beforehand if necessary, otherwise the factory set files will be stored.
- Make a scene file for every corner and file them.
- Use the main switch of the power supply to turn on/off the camera system. Setting Color Mode or Test Mode is not recommended because it will lengthen the set up process time. Also, lens close is not necessary for CCD cameras.
 Usually, this kind of operation works well. So a system check or adjustment once every 3 to 6 months should suffice.

6-2. Case 2 — for general operations

1. One-touch power on
Turn on the power for the whole camera system using the main switch of the power supply for system stability.

2. Camera head connection
(1) When the CCU has already been connected to the camera head, do the heat run for 10 to 30 minutes.
(2) When the camera head connection needs to be changed, turn off the HEAD POWER through the CCU or RCP.
(3) Check the cable indicator on the CCU. If the light of the indicator goes off, then you can turn on the camera power.
(4) Turn the camera power off using the POWER SW on the camera head side when changing the accessories such as a lens or viewfinder.

3. Camera adjustment
(1) Press the STANDARD button to clear the data from the last shooting, or execute Auto Setup.
(2) Perform auto white balance using a gray scale or standard white chart.
(When shooting the scale or chart, use the same lighting equipment that will be used for program shooting. Be sure to direct light on the scale or chart uniformly under standard illumination that will be used in the studio because it will affect the shading adjustment)

4. Keep all the cameras at the same level by adjusting the IRIS and MASTER PED. Usually, this step can be skipped over if the initial setting is accurate.

5. Precise camera adjustment
(1) Previous check - Check the gray scale for any stains, spots, cracks, or imperfections. It is recommended to change the scale every 3 to 6 months. Be sure to keep the scale at normal room temperature in a dark area because it is painted with a specific pigment that may be altered depending on its storage environment.
(2) Monitor adjustment - Perform the adjustment by using the calibrations on the waveform monitor and picture monitor.
(3) Color bar adjustment - Precisely adjust the color bar level and black balance of each camera to the same level.
(4) Gray scale adjustment - Make the R/G/B levels be consistent with each other from black level to white level by shooting a gray scale.
(5) In case the black balance is out of line - Check the black balance at the time of lens close whether it is in line or not. If not, execute Auto Black, or adjust the R/G/B BLK to the same level between each signal.
(6) Open the IRIS and adjust the white level to 100%. Execute Auto White or adjust RGB WHT to make the R/G/B levels be consistent with each other.
(7) Perform Gamma level adjustment when the gray scale cross-point level is out of line.
(8) Perform Flare adjustment when the gray scale's darkest level has a level difference in the low frequency area. Even if the level difference is around 1 to 2 stop iris in the Flare adjustment, perform a fine adjustment to minimize the difference. Be sure to repeat the adjustments because the adjusted items affect each other subtlety when using a gray scale for fundamental adjustment.
(9) Shading adjustment - Sometimes the R/G/B levels are not consistent with each other even after a gray scale adjustment. This occurs when the shading adjustment is not sufficient or when a lens is changed.
[1] Preparation beforehand - A total white pattern or an integrating spherical pattern

box. For this adjustment, a White Chart exposed to a uniform light is also needed.

[2] Black shading - Execute AUTO BLK SHADING for the models that have this function. For manual adjustment, adjust in 12 (3 x 2 x 2) different combinations: R/G/B channels (3), vertical (V) and horizontal (H) (2) for each of them, SAW wave, and PARA wave (2).

[3] White shading - Select a lens file. V-SAW in white shading changes according to the exit pupil of the lens. The exit pupil also changes according to the zoom position when using a zoom lens. The change caused by the exit pupil appears on the G-channel. For that, a MOD V SAW adjustment should be carried out. Sometimes the color matching between the cameras may still not be in line even after a gray scale adjustment. In most cases, this is because the white shading is out of line.

6. Color matching between the cameras

Even after making the above camera adjustments (Steps 5-(1) to 5-(9)), there still might be a very small difference between the cameras. This difference is so slight that it can usually be ignored. However, if it is desired to make a closer match, then please proceed as follows: Choose a camera as a standard reference and adjust the levels of black, gamma and flare detail of the other cameras to match those of the camera chosen as the reference standard.

Notes

Be sure to situate each camera as close as possible to each other because the reflected light changes depending on the angle of reflection even when shooting the same chart. There are always some variances between different-model lenses. Fine adjustment is needed even between the same model lenses because the correction value cannot be the same.

6-3. Initial Settings for the Control System

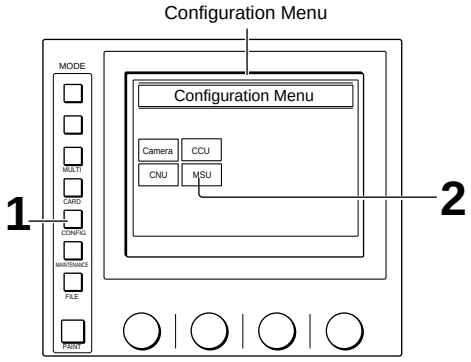
For a system using the MSU-700A/750, you need to set parameters for control of your system from the MSU-700A/750 as well as the operating conditions of the MSU-700A/750. The MSU-700A/750 has an Engineer Mode, which allows you to assign cameras to be controlled from the MSU-700A/750 and to limit the operations on the MSU-700A/750. To authorize specific persons to use this Engineer Mode, specify a security code in advance. Once the security code is set, the MSU-700A/750 will enter into the Engineer Mode when this security code is input.

6-3-1 *Specifying the Security Code*

You can set, change, or delete the security code for entering into the Engineer Mode as follows:

6-3-1-1 To set a new security code

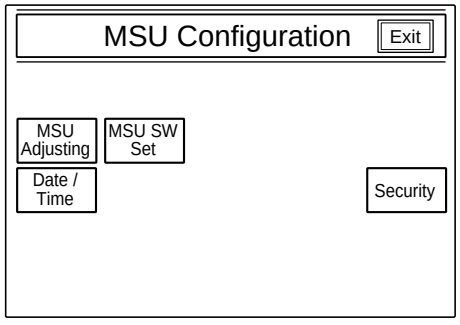
Menu operation block (Example:MSU-700A)



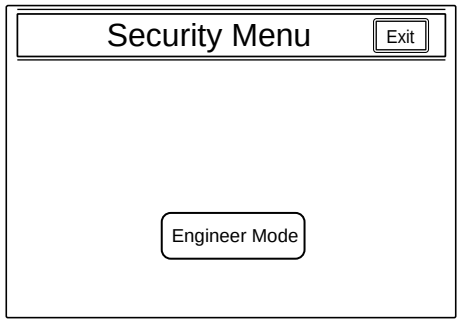
Note

At the factory the unit is set in a mode in which no security code is used. To use a security code, it is necessary to enable the use of a security code. See "To enable to cancel the security code"

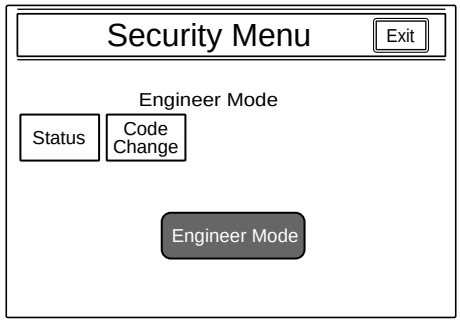
1. Press and light the CONFIG button.
 The configuration menu appears on the display.
2. Press **[MSU]**.
 The MSU Configuration Menu appears.



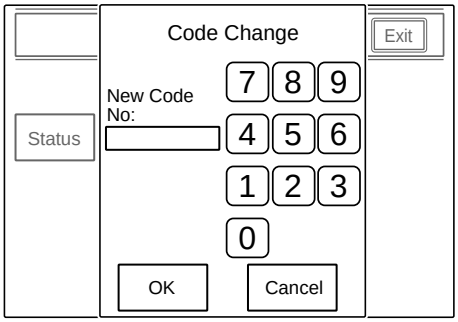
3. Press **[Security]**.
 The Security Menu display appears.



4. Press **[Engineer Mode]** to set it to inverse video.
 The Security Menu items now appear.



5. Press **[Code Change]**.
 The numeric keys and field for entering a New Code No. are displayed.

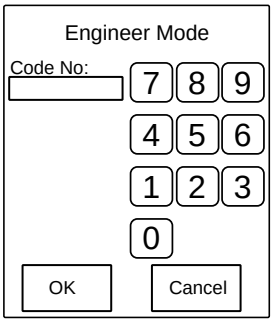


6. Enter the desired code (1 to 8 digits) using the numeric keys, then press **[OK]**.
 Note
 Each digit you input will be displayed in an asterisk. The message "Retype New Code No." is then displayed.
7. Enter the same code you entered in step **5** once again, then press **[OK]**.
 The security menu is restored.
8. Press **[Exit]**.
 The specific security code is now registered. When you next press **[Engineer Mode]** on the security menu, the numeric keys appear and the code input is required. The MSU-700A/750 will enter the Engineer Mode, if you enter the code properly and press **[OK]**.

6-3-1-2 To change the security code

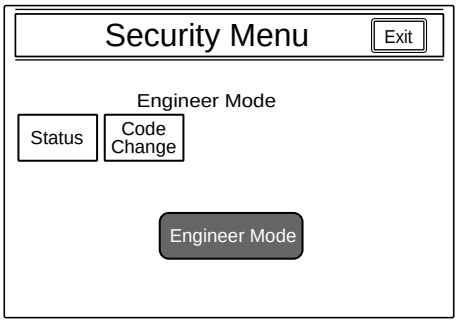
When the registered security code must be changed, proceed as follows.

1. Display the security menu items by following steps **1** through **3** of the above procedure for setting a new code.
2. Press **[Engineer Mode]**.
 The numeric keys and field for entering the Code No. are displayed.

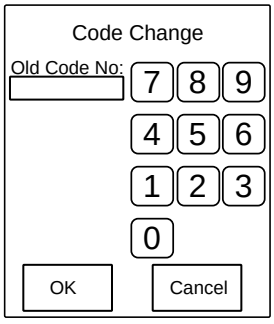


3. Enter the old security code using the numeric keys, then press **[OK]**.

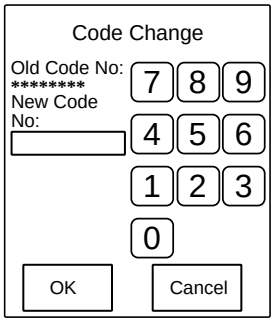
Note
Each digit you input will be displayed as an asterisk. Security menu items now appear.



4. Press **[Code Change]**.
 The numeric keys and field - for entering the Old Code No. are displayed.



5. Enter the old code, then press **[OK]**.
 The field for entering a New Code No. now appears.

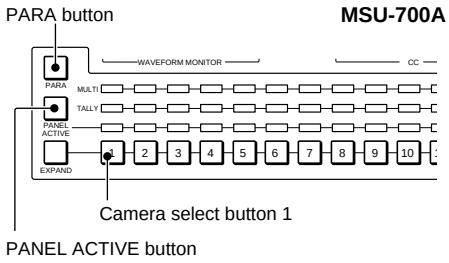


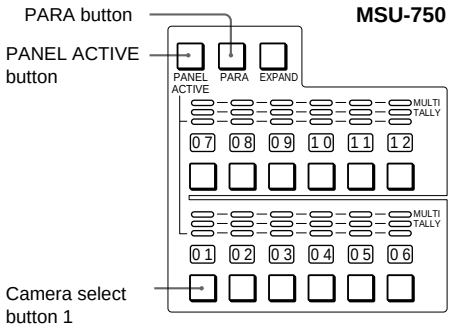
6. Specify a New Code No. by following steps **6** through **8** of the previous procedure.

6-3-1-3 To enable to cancel the security code

To use a security code while in the Engineer Mode, it is necessary to set the unit in a mode to use the security code. If the operator forgets the security code, or if an adjustment while in the Engineer Mode becomes necessary in an emergency when the authorized operator is absent, the security code can be canceled by the following procedure:

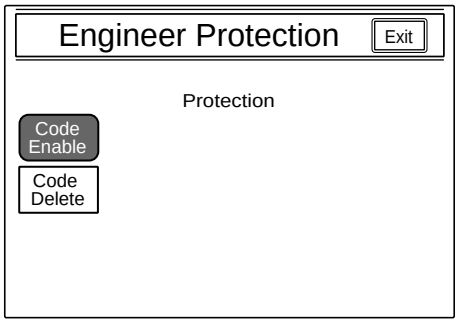
1. Turn on the power to the MSU-700A/750 while holding PARA, PANELACTIVE, and camera select buttons pressed.





The numeric keys appear on the display.

2. Press the **[0] [3] [5] [9]** of the numeric keys to enter "0359" in the field for entering the security code, then press **[OK]**.
The Engineer Protection display now appears.



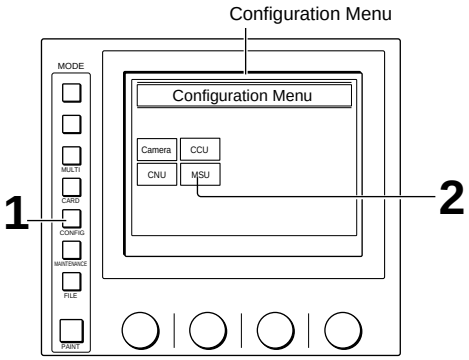
3. To delete the security code, press **[Code Delete]**. To temporally disable the security code, press **[Code Enable]** to change it from inverse video to unhighlighted display. (Once you press it again to return it to inverse video, the security code is enabled.)
4. As the message "Code Delete, OK?" is displayed, if you press **[Code Delete]** in step 3, press **[OK]** to return to the Engineer Protection display.
5. Press **[Exit]**.
Note
At the factory, the unit is set in a mode in which no security code is used.

6-3-2 *Setting the Security Status*

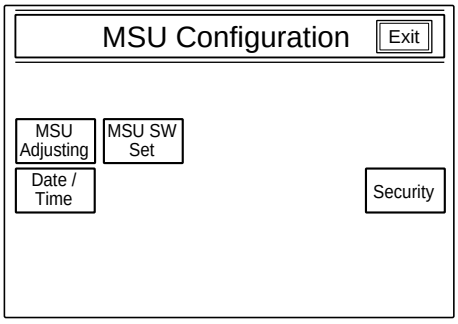
You can limit the control functions of the MSU-700A/750 when required. The status setting is enabled in the Engineer Mode.

Operation
Proceed as follows:

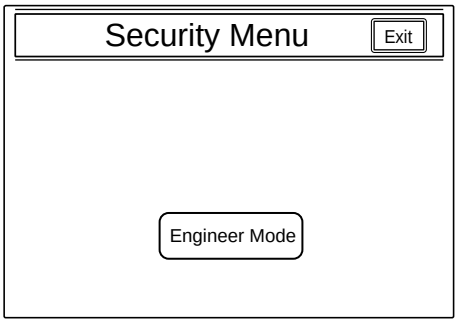
Menu operation block(Example:MSU-700A)



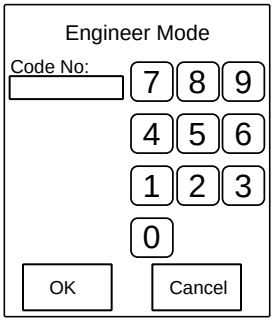
1. Press to light the CONFIG button.
2. Press **[MSU]**. The MSU Configuration Menu appears.



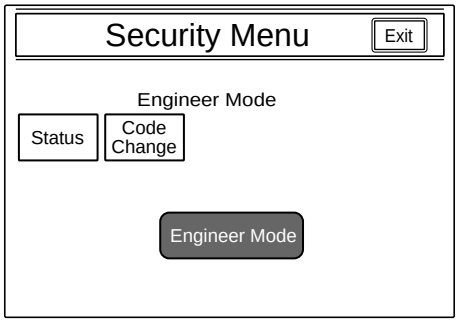
3. Press **[Security]**. The Security Menu display appears.



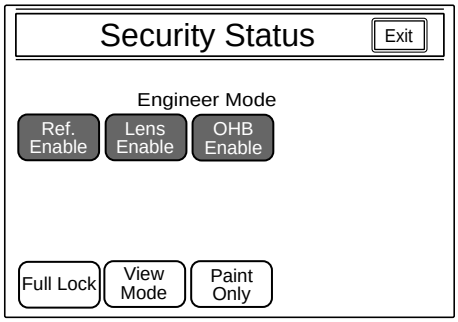
4. Press **[Engineer Mode]** to set it to inverse video. The numeric keys and field for entering the Code No. are displayed.



5. Enter the security code using the numeric keys, then press **[OK]**.
 Note
 Each digit you input will be displayed as an asterisk. The Security Menu items now appear.



6. Press **[Status]**. The display changes to the Security Status setting display.

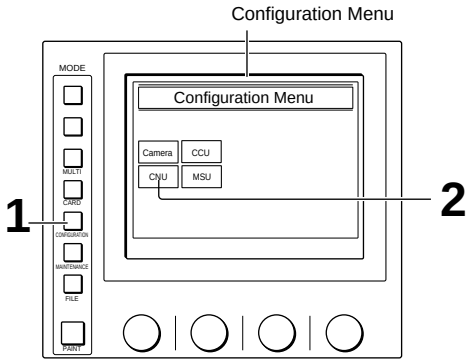


7. Setting the status for control from the MSU-700A/750.
 [Ref. Enable]: Set it to inverse video to enable the setting in the reference file (Factory setting: ON).
 [Lens Enable]: Set it to inverse video to enable the setting in the lens file (Factory setting: ON).
 [OHB Enable]: Set it to inverse video to enable the setting in the OHB file (Factory setting: ON).
 [Full Lock]: Set it to inverse video to fully disable the MSU-700A/750 (Factory setting: OFF)
 [View Mode]: Set it to inverse video to disable all operations from the MSU-700A/750 other than data reference (Factory setting: OFF). (Only the display and indicators will be active. Any setting and adjustment will be disabled.)
 [Paint Only]: Set it to inverse video to enable the paint control only (Factory setting: OFF).
8. When the status settings are completed, press **[Exit]**.
 The Security menu display in step 5 is restored.
9. Press **[Engineer Mode]** to exit the Engineer Mode.
 The statuses specified in step 7 become valid.
 Note
 All operations are enabled in the Engineer Mode regardless of the above status settings.

6-3-3 *MSU Assignment*

You can assign specific units among the cameras in the same system to be selected or controlled from the MSU-700A/750. The MSU assignment is to be made, for example, to assign cameras to each MSU-700A/750 when multiple MSU-700A/750 units are used in the same system. This assignment operation is enabled in the Engineer Mode. Turn on the CONFIG/MSU/SECURITY/ENGINEER Mode to activate the Engineer Mode.

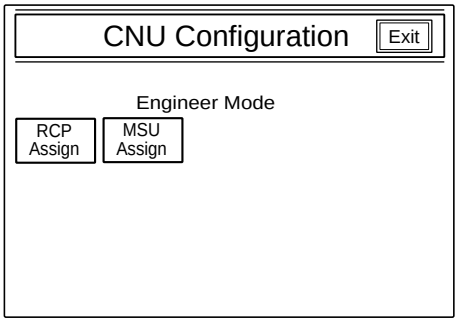
Operation
Proceed as follows:



(Example:MSU-700A)

1. Press to light the CONFIG button on the menu control block to call the Configuration menu on the display.
2. Press **[CNU]**.
 The CNU Configuration menu appears.

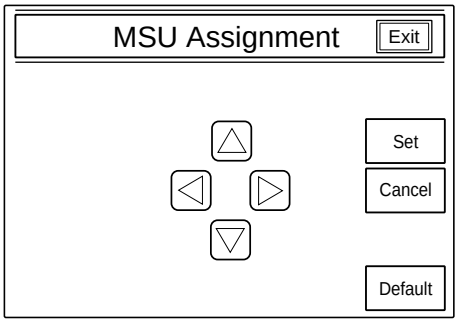
CNU Configuration menu



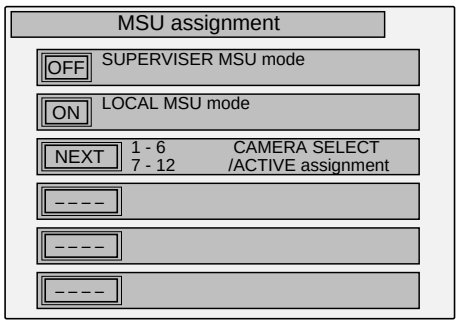
Note
The item **[MSU Assign]** is displayed only when the Engineer Mode is active.

3. Press **[MSU Assign]**.
 The MSU Assignment menu now appears. Simultaneously, the character display of the CNU-700 changes to the MSU Assignment mode. Using the four arrow buttons on the MSU Assignment menu (MSU-700A/750), move the cursor on the character display of the CNU-700 to the point where you wish to change the assignment.

MSU Assignment menu

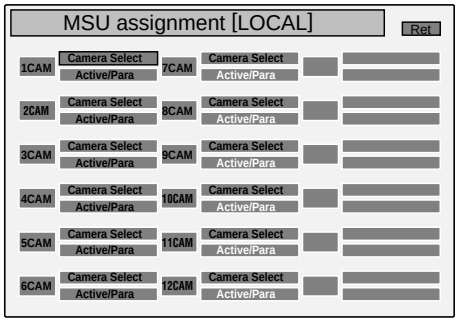


Character display of the CNU-700 (in MSU Assignment mode)



4. Select the control mode.
 SUPERVISER MSU mode: To control the cameras connected to the entire CNU (Camera Network Unit) in the same system.
 LOCALMSU mode: To control the cameras connected to only the CNU (Camera Network Unit) connected to the MSU-700A/750 being operated.
 Selection can be linked between the camera select buttons on the MSU-700A/750 and the HD router (MP-1007) and routing switcher (DVS-V1201). In this case, 9-pin cables are needed to connect between the MP-1007 and DVS-V1201.
 Move the cursor to the mode in OFF status and press **[Set]** on the MSU Assignment menu to switch between modes. When the SUPERVISER mode is active, you can select the setting display for each camera group in the same system from the lower rows on the character display of the CNU-700.
5. Select the camera group to be set.
 In LOCAL MSU mode, only the group of cameras 1 through 12 (standard) can be selected. Pressing **[Set]** on the MSU Assignment menu with the cursor on **[NEXT]** calls up the setting display for the selected camera group.

Example: Setting display in LOCAL MSU mode

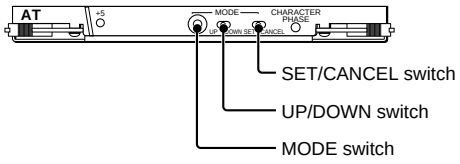


6. Select the control functions for each camera.
 Camera Select: Selection by the corresponding camera select button on the MSU-700A/750
 Active/Para: Control from the MSU-700A/750 in Panel Active/Parallel mode.
 Each item is on (selection/control enabled) when the characters are shown in black, and off (selection/control disabled) when the characters are shown in white. Each time [Set] is pressed on the MSU Assignment menu with the cursor on the item turns it on or off.
 Caution
 Be sure to enable the camera selection for at least one camera. If selection/control is disabled for all the connected cameras, the MSU-700A/750 becomes inoperative and the MSU Assignment mode cannot be selected anymore. If this occurs, change the MSU assignment as described in "To restore operations of the MSU-700A/750" on the next page.
 To resume the initial assignment
 Press **[Default]** on the MSU Assignment menu.
7. When your settings are completed, press **[Set]** on the MSU Assignment menu with the cursor on **[Ret]** in the upper right of the CNU character display. (To cancel the settings, press **[Cancel]**.)
 The character display of the CNU-700 returns to its previous status (MSU Assignment display).
 In SUPERVISER MSU mode, perform the settings for the cameras of other groups in the same manner.

When the MSU assignment is completed
Press [Exit] on the MSU Assignment menu.

6-3-3-1 To restore operations of the MSU-700A/750

If the MSU-700A/750 has become inoperative by disabling the selection/control for all the connected cameras, change the MSU assignment using the internal switches of the CNU-700 as follows:

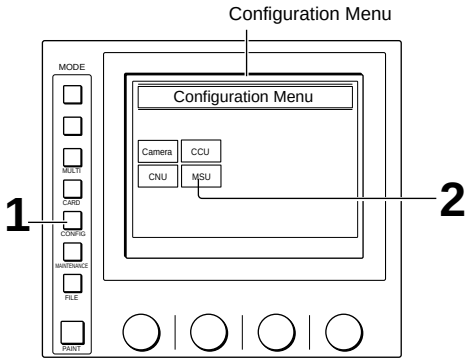


1. Set the MODE switch to 3.
 The message "MSU Assignment" appears on the screen.
2. Push the SET/CANCEL switch (S6) toward SET.
 The same MSU Assignment display as that in step **3** on the previous page appears. Each press of the UP/DOWN switch (S5) toward DOWN moves the cursor on the display to the right, or down when it reaches the right edge of the frame. Each press of the switch toward UP moves the cursor to the left, or up when it reaches the left edge of the frame.
3. Move the cursor to the desired position, then push the SET/CANCEL switch (S6) toward SET.
4. Repeatedly push the UP/DOWN switch (S5) toward UP until the cursor reaches the SAVE position outside the frame.
5. Push the SET/CANCEL switch (S6) towards SET.
 The assignment set in steps **3** and **4** is written to nonvolatile memory.
6. Return the MODE switch to 0.

6-3-4 *Setting the Operating Conditions of the MSU*

By using the MSU Configuration menu you can also set the built-in clock of the MSU-700A/750 and adjust various conditions of the MSU-700A/750, such as the sound volume of the warning buzzer and the brightness of the lamp and EL display.

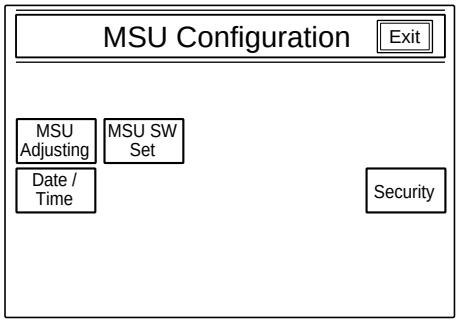
6-3-4-1 To display the MSU Configuration menu



(Example:MSU-700A)

1. Press to light the CONFIG button.
 The Configuration Menu appears on the display.
2. Press **[MSU]**.

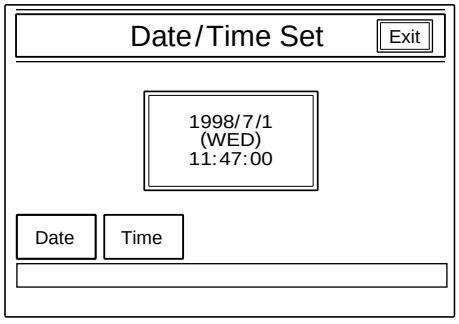
The MSU Configuration menu appears.



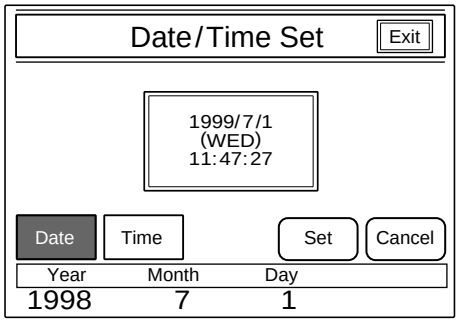
6-3-4-2 To set the built-in clock

The MSU-700A/750 has a built-in clock to record the date and time when reference and scene files are saved to IC memory cards. To set the clock, proceed as follows.

1. Press **[Date/Time]** on the MSU Configuration menu.
 The current setting is displayed on the Data/Time Set menu.



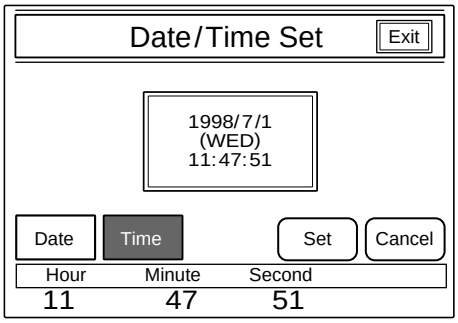
2. To set the date:
 (1) Press **[Date]** to set it to inverse video.



 (2) Set the Year, Month, and Day with the left three control knobs.
 (3) Press **[Set]**.

 The set date becomes valid. To restore the previous setting, press **[Cancel]** instead of **[Set]**. Date/Time Set Exit

3. To set the time:
 (1) Press **[Time]**.



 (2) Set the Hour, Minute, and Second with the left three controls.
 (3) Press **[Set]** in synchronization with a time signal.

 The set time becomes valid. To resume the previous setting, press **[Cancel]** in place of **[Set]**.

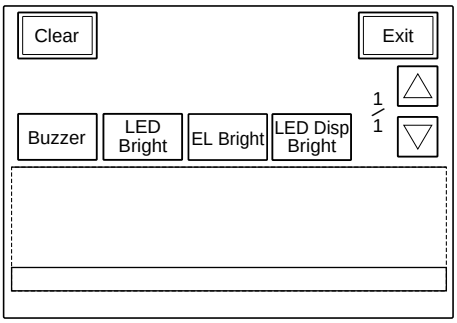
When the clock setting is completed

Press **[Exit]** to leave this menu.

6-3-4-3 To adjust the buzzer sound

A buzzer sounds on the MSU-700A/750 when it receives a call signal or when a panel control is operated. When required, you may turn on/off the buzzer or adjust the sound volume. To adjust the buzzer, proceed as follows:

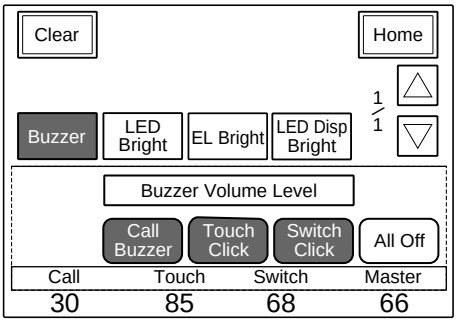
1. Press **[MSU Adjusting]** on the MSU Configuration menu.
 The MSU adjustment menu appears.



Note

[LED Disp Bright] is displayed with the MSU-750 only.

2. Press **[Buzzer]** to set it to inverse video.
 The lower half of the display becomes the Buzzer Volume Level adjustment display.



3. Adjust the levels with the three control knobs.
 Call: Sound volume of the buzzer when a call signal is received
 Touch: Sound volume of the buzzer when a button displayed on the menu display is operated
 Switch: Sound volume of the buzzer when a button on the panel is operated. The master volume can be adjusted with the rightmost control knob.

6-3-4-4 To turn on/off the buzzers independently

Press the corresponding button. When it is in inverse video, the buzzer is on.
[Call Buzzer]: For the buzzer sound when a call signal is received
[Touch Click]: For the buzzer sound when a button displayed on the menu display is operated
[Switch Click]: For the buzzer sound when a button on the panel is operated

6-3-4-5 To turn off all the buzzers

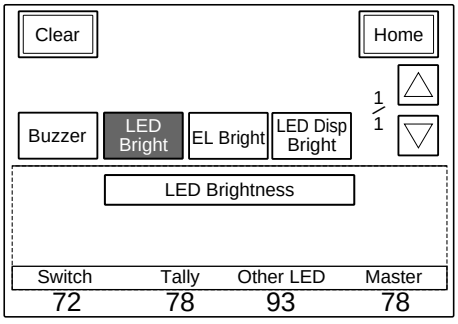
Press **[All Off]**.

When the adjustment is completed
Press **[Home]** to return to the MSU adjustment menu, and press **[Exit]** to release the menu operation.

6-3-4-6 To adjust the brightness of the LEDs

You can adjust the brightness of the LEDs of the panel buttons and camera number/tally indication window. To adjust the brightness, proceed as follows.

1. Press **[MSU Adjusting]** on the MSU Configuration menu to display the MSU adjustment menu.
2. Press **[LED Bright]** to set it to inverse video. The lower half of the display becomes the LED Brightness adjustment display.



3. Adjust the brightness with the three corresponding control knobs.
 Switch: Brightness of the built-in LEDs of the control buttons
 Tally: Brightness of the built-in LEDs of the camera number/tally indication window
 Other LED: Brightness of the other LED indicator, such as those of the camera select block and the ACCESS indicator

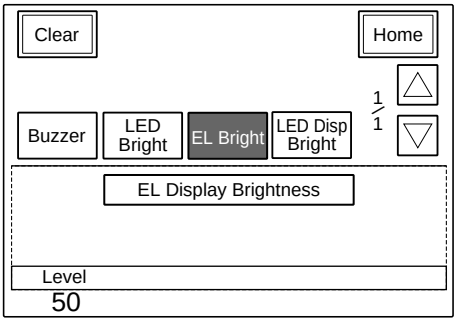
The master brightness can be adjusted with the rightmost control knob.

When the adjustment is completed
Press **[Home]** to return to the MSU adjustment menu, and press **[Exit]** to release the menu operation.

6-3-4-7 To adjust the brightness of the EL display

You can adjust the brightness of the display of the menu control block. To adjust the brightness, proceed as follows.

1. Press **[MSU Adjusting]** on the MSU Configuration menu to display the MSU Adjustment menu.
2. Press **[EL Bright]** to set it to inverse video. The lower half of the display becomes the EL Display adjustment display.



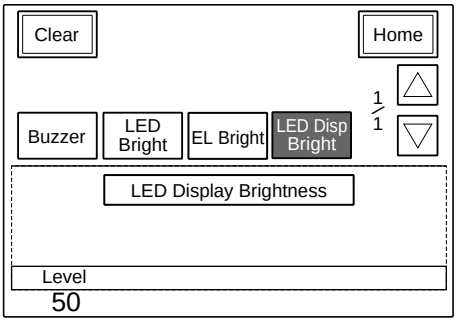
3. Adjust the brightness with the leftmost control knob.

When the adjustment is completed
Press **[Home]** to return to the MSU adjustment menu, and press **[Exit]** to leave this menu.

6-3-4-8 To adjust the brightness of the LED displays (MSU-750 only)

You can adjust the brightness of the LED displays (camera number indicators) on the control panel. To adjust the brightness, proceed as follows.

1. Press **[MSU Adjusting]** on the MSU Configuration menu to display the MSU Adjustment menu.
2. Press **[LED Disp Bright]** to set it to inverse video. The lower half of the display becomes the LED Display Brightness adjustment display.



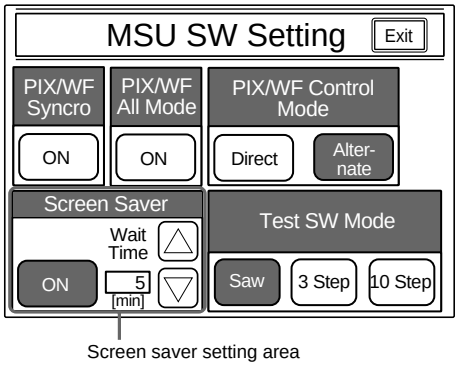
3. Adjust the brightness with the leftmost control knob.

When the adjustment is completed
Press **[Home]** to return to the MSU adjustment menu, and press **[Exit]** to leave this menu.

6-3-4-9 To set the screen saver

The screen saver can be activated to protect the menu display when the MSU-700A/750 is not operated for a certain time. The screen saver can be turned on and off as required, and the time to activate it can be adjusted. To set the screen saver, proceed as follows.

1. Press **[MSU SW Set]** on the MSU Configuration menu.
 The MSU SW Setting display appears.



Note
The Test SW Mode Setting area is displayed with the MSU-750 only.

2. Press **[ON]** to set it to inverse video to activate the screen saver.
3. When the screen saver is turned on, set the wait time (in units of minutes) until it activates by pressing △ or ▽.

When the adjustment is completed
Press **[Exit]** to leave this menu.

6-4. File Structure

The HDC-900 is able to store adjustment data in memory in the form of files. There are six types of files, for different purposes:

(1) Operator File
Stores the items displayed on the viewfinder and switch settings for the camera operator. This file is stored in the Memory Stick media card, yet the video data (paint data) cannot be stored.

(2) Preset Operator File
Stores the standard state of operator file items. This file is stored in the camera, yet video data (paint data) cannot be stored.

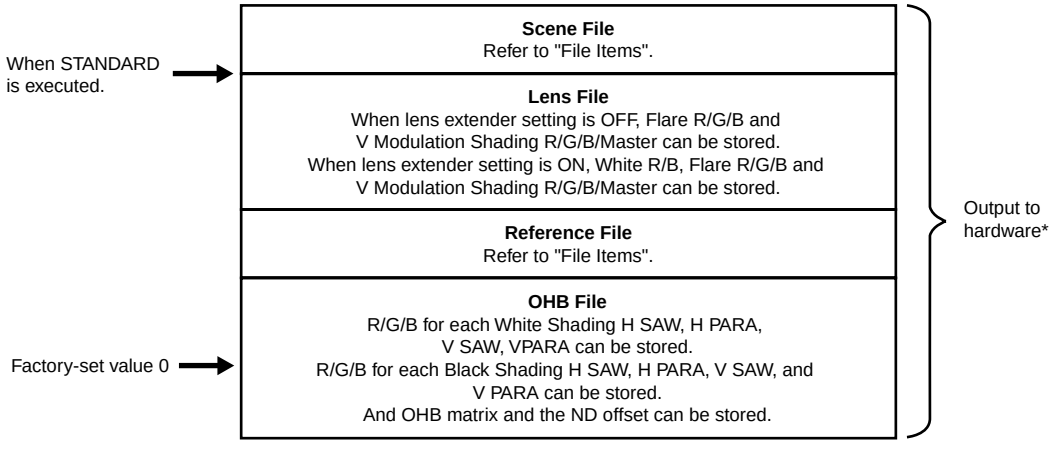
(3) Scene File
Stores the temporary video setting data according to the scene. This file is stored in the camera and Memory Stick media card.

(4) Reference File
Stores the custom paint data adjusted by the video engineer. This file is stored in the camera and Memory Stick media card.

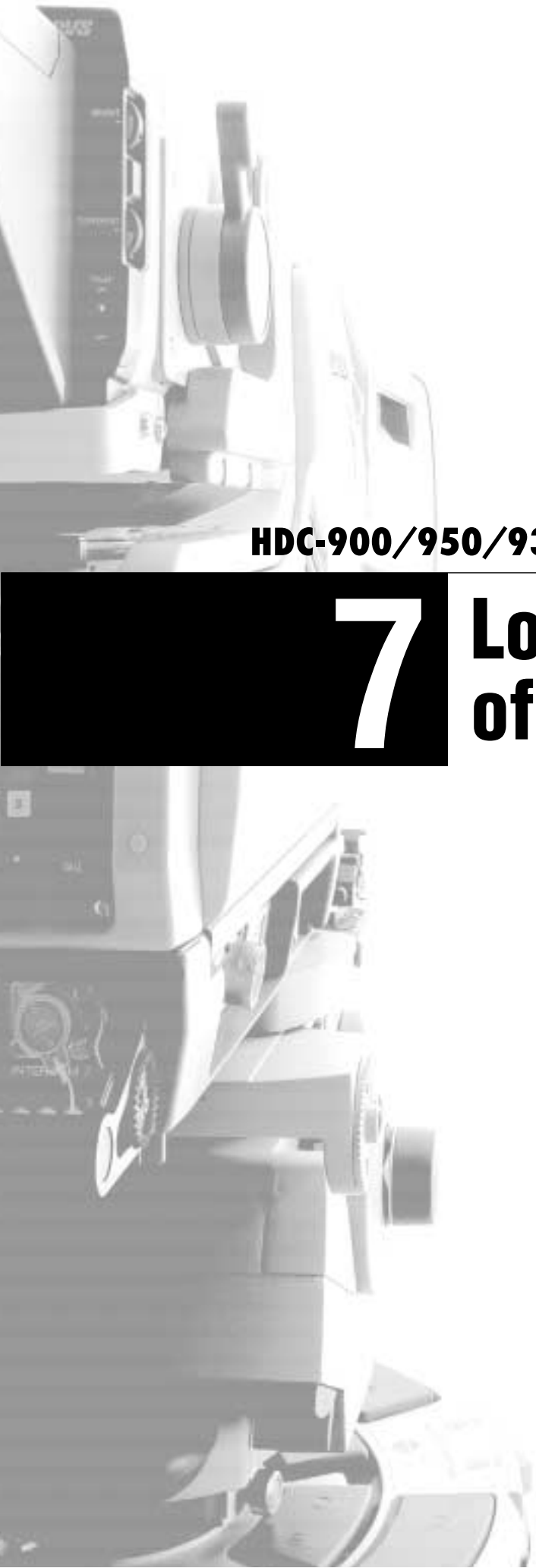
(5) Lens File
Used for compensation of the deviation which generates by switching the lens extender from OFF to ON and for compensation of the difference in the characteristics between lenses. This file is stored in the camera.

(6) OHB File
Used for adjustment of the CCD block maintenance. This file is stored in the camera.

Table 6-1: Structure of Paint Related Files



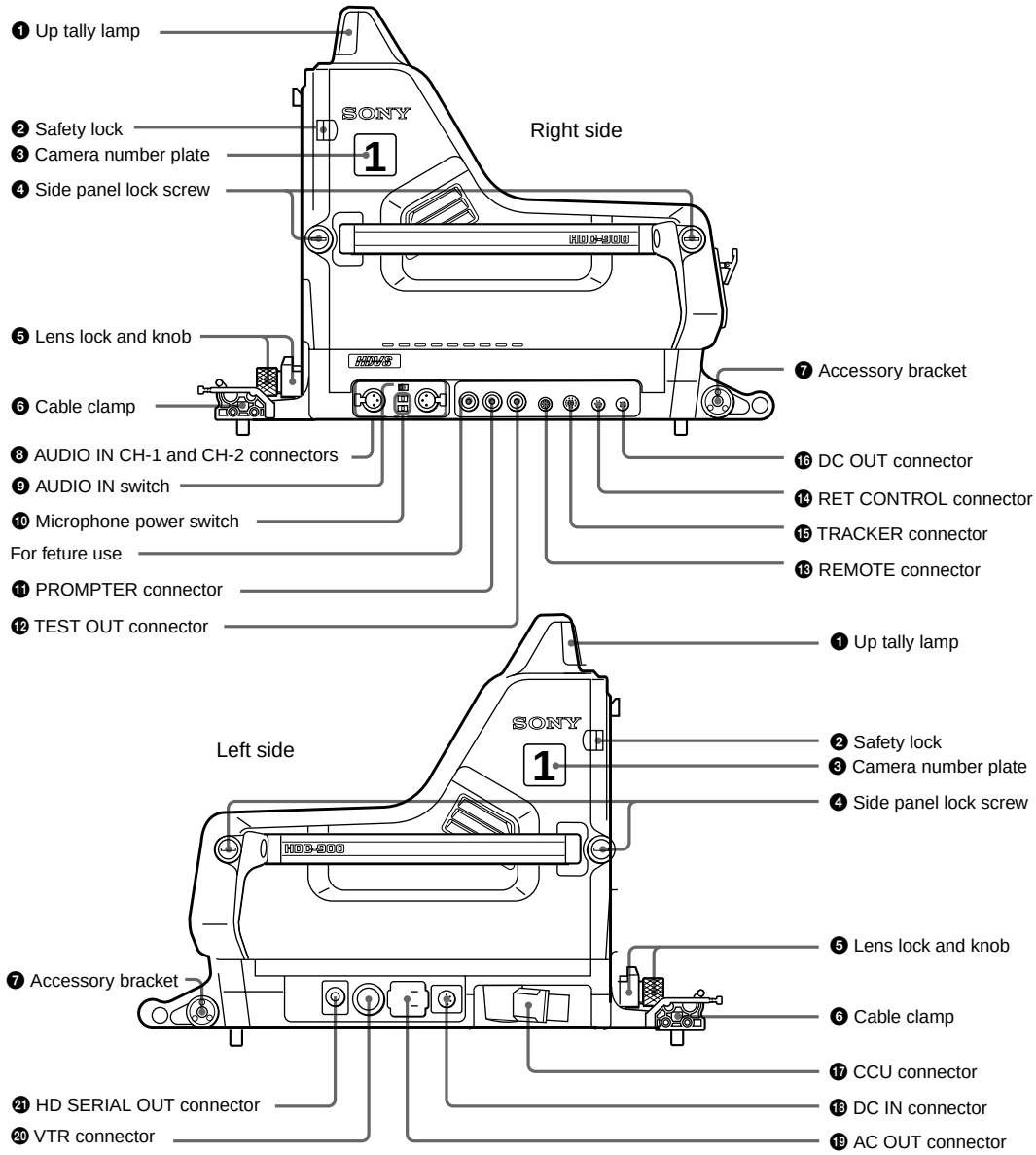
** The additional data of each file is sent to each circuit on the unit.*



7 Location and Function of Parts and Controls

7-1. HDC-900, HD Color Video Camera

7-1-1 *Right Side and Left Side Panels*



❶ Up tally lamp
Lights when the camera receives a red tally signal. When the CALL button on the MSU-700A/750 Master Setup Unit or the RCP-700 series Remote Control Panel is pressed, the lamp lights if previously off or goes off if previously on. The brightness of the lamp may be adjusted using the menu. Setting the UP TALLY switch on the rear panel to OFF will keep the lamp from lighting. Attach a supplied number plate (0 through 9) to display the camera number.

❷ Safety lock
Locks the side panel to prevent accidental opening. To open the side panel, loosen the side panel lock screws, slide the safety lock toward the lens and open the panel. The side panel locks automatically when closed.

❸ Camera number plate
Attach a light gray number plate (supplied) to display the camera number.

❹ Side panel lock screws
These screws secure the side panel. Turn clockwise until tight to lock the panel.

❺ Lens lock and knob
These lock the lens. To attach or remove a lens, turn the knob counterclockwise until the lens lock is horizontal. To secure the lens, turn the knob clockwise until the lens lock is vertical.
Note
To attach a large lens, remove the pin from the bayonet mount of the lens.

❻ Cable clamp
Used to secure the fiber optic cable. The clamp is designed for the FC2-PD50 and FC2-PD250.

❼ Accessory bracket
Used to secure optional accessories such as the BKP-7911/7912 Script Holder or Focus/Zoom Demand.

For more information on attaching an accessory, see the accessory's operation manual.

❽ AUDIO IN CH-1 and CH-2 connectors (XLR 3-pin)
Used to input microphone or line signals.

❾ AUDIO IN switch
Set this switch according to the device connected to the AUDIO IN CH-1 and CH-2 connectors.
MIC: When connecting microphones
LINE: When connecting line signal sources

❿ Microphone power switches
For the microphones connected to the AUDIO IN CH-1 and CH-2 connectors, respectively.
+48 V: When the connected microphone requires an external power source. A power of +48 V is supplied to the microphone.
OFF: When the connected microphone requires no external power.
Note
To supply a power of +12 V, modification of the camera is required. For details, refer to the Installation & Maintenance Manual. Note that the modification must be performed by service personnel.

⓫ PROMPTER connector (BNC type)
Used to output the signal input from the HDCU-900 Camera Control Unit's PROMPTER INPUT connector.

⓬ TEST OUT (test signal output) connector (BNC type)
Used to output the signal selected by the video signal select buttons on the rear panel. If the RET 1 or RET 2 button is pushed in, the output will be a return video signal.

⓭ REMOTE connector (8-pin)
Used to connect the camera to an optional MSU-700A/750 Master Setup Unit or RCP-700 series Remote Control Panel, via a CCA cable. The connected unit may then control the HDC-900.

⓮ TRACKER connector (20-pin)
Used for communication between the camera operator and the tracker, and also for intercom channels 1 and 2. It also supplies the up tally signal and the program audio signal.

⓯ RET (return video) CONTROL connector (6-pin)
This connector allows an external controller to switch return video 1, 2, and 3, as well as turn the intercom microphone on and off.

⓰ DC OUT connector (4-pin)
Used to supply power (12 V, 5 W maximum) to a script light of the BKP-7911/7912 Script Holder.

⓱ CCU (camera control unit) connector (electro optical multi-connector)
Connect to the CAMERA connector of the HDCU-900 Camera Control Unit using an electro-optical composite cable. Power and video, audio, and control signals are passed between the camera and the control unit using just one cable.

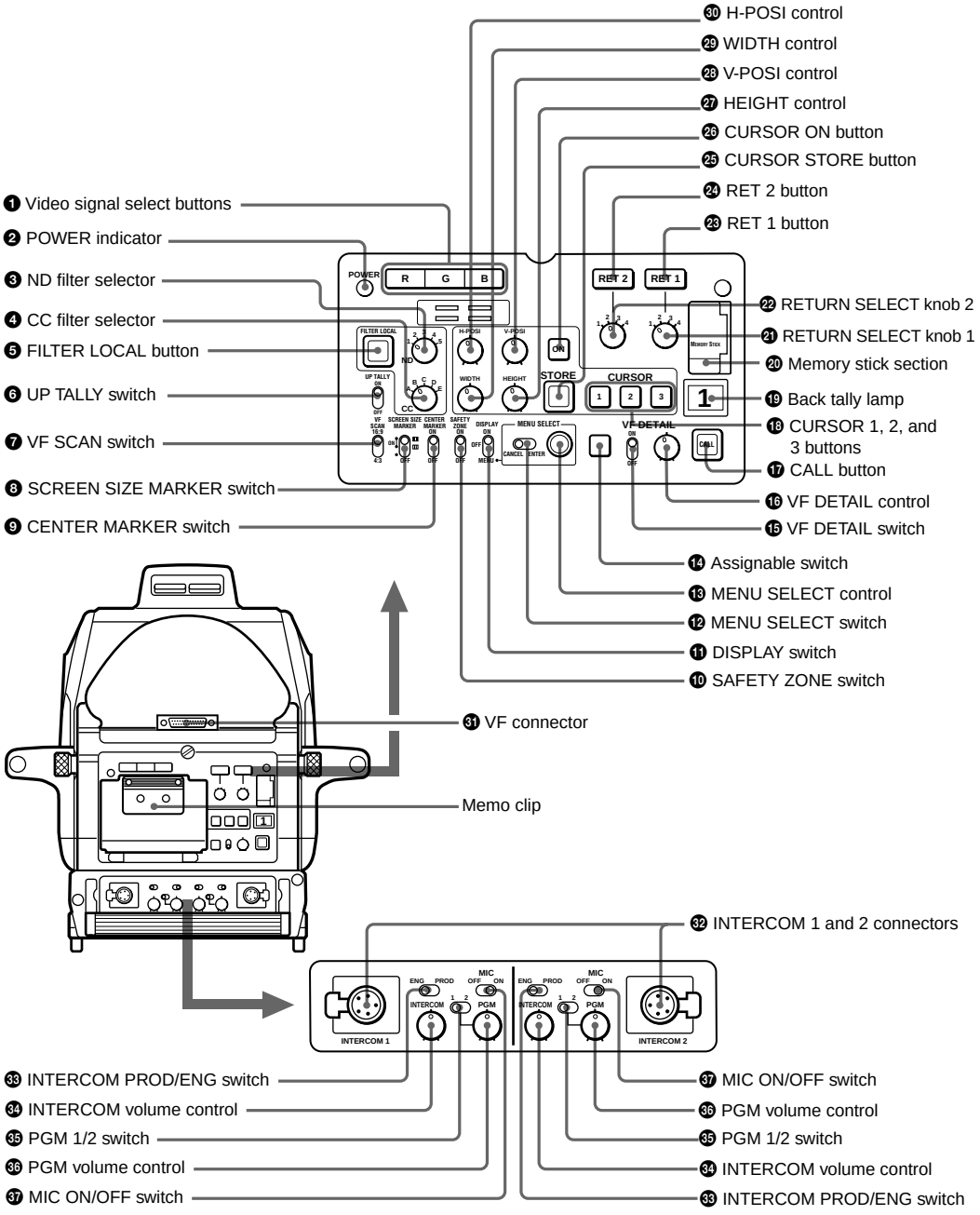
⓲ DC IN connector (4-pin)
Connect to a DC power source (10.5 to 17 V) when using the HDC-900 as a stand-alone unit.

⓳ AC OUT connector
Used to supply AC power (200 VA maximum).

⓴ VTR connector (26-pin)
When using the camera in stand-alone use, a VTR can be connected using an HDCZ cable to this connector. In this case, however, the VTR cannot be started or stopped from the camera.

㉑ HD SERIAL OUT connector
A serial digital interface with a transfer speed of 1.5 Gbps, this connector may be used to output a video signal to a monitor or VTR.

7-1-2 *Rear Panel*



❶ Video signal select buttons

Select the video output signal (R, G, or B) to the viewfinder. The R, G, and B buttons may be pressed individually or in combination. The signal corresponding to each pressed button will be output. When two buttons are pressed, the output of will consist of those two signals mixed together.
The video output to the monitor connected to the TEST OUT connector will always be the Y signal regardless of these buttons.

When a color viewfinder is used:

- When all three buttons are pressed, the output to the viewfinder and monitor will be the Y signal.
- When no button is pressed, the output to the viewfinder will be the color signals and to the monitor will be the Y signal.

❷ POWER indicator

This indicator lights up or goes off as follows to indicate the power supply status:

Green: Power is being supplied to the HDC-900.
Red: The CAM PW button of the MSU-700A/750 Master Setup Unit or RCP-700 series Remote Control Panel is set to OFF.
Yellow: Power is being supplied to the HDC-900, but the VF PW button of the MSU-700A/750 Master Setup Unit or RCP-700 series Remote Control Panel is set to OFF, and power is not being supplied to the viewfinder.
Off: Power is not being supplied to the HDC-900.

❸ ND filter selector
When the FILTER LOCAL button is lit up, this selector may be used to select an ND filter.

Selector position	Selected filter
1	Clear
2	1/4ND
3	1/8ND
4	1/16ND
5	1/64ND

❹ CC (color temperature conversion) filter selector
When the FILTER LOCAL button is lit up, this selector may be used to select a color temperature conversion filter appropriate to the light source illuminating the subject.

Selector position	Selected filter
A	Cross filter
B	3200K (clear)
C	4300K
D	6300K
E	8000K

❺ FILTER LOCAL (filter local control) button
Pressing this button enables selection of a color temperature conversion filter or ND filter using the CC filter selector and ND filter selector. Pressing the button again gives control of the filters to the MSU-700A/750 Master Setup Unit or RCP-700 series Remote Control Panel.

❻ UP TALLY switch
Set whether or not the camera's Up Tally lamp and the lens' tally lamp will light when the camera receives a red tally signal.
ON: The tally lamps will light.
OFF: The tally lamps will not light.

❼ VF (viewfinder) SCAN switch
Used to control the viewfinder screen display.
16:9: To set the viewfinder display to 16:9 aspect ratio.
4:3: To set the viewfinder display to 4:3 aspect ratio.

❽ SCREEN SIZE MARKER switch
Used to control the display of the screen size marker as follows:
ON (▮): Areas outside the specified ratio area will be darkened.
ON (▯): The screen size marker (white lines) will be displayed.
OFF: The screen size marker will not be displayed.

❾ CENTER MARKER switch
Used to control the display of the center marker as follows:
ON: A marker indicating the center of the picture area will be displayed on the viewfinder screen. The position of the center marker may be adjusted for the lens being used. The adjusted position may be stored in a lens file.
OFF: The center marker will not be displayed.

❿ SAFETY ZONE switch
Used to control the display of the safety zone marker as follows:
ON: A frame marking 90% of the picture area (the safety zone) will be displayed on the viewfinder screen. Using the Marker Settings page in the Operation menu, the size of the displayed frame may also be set to 80%, 92.5%, or 95% of the picture area.
OFF: The safety zone will not be displayed.

⓫ DISPLAY switch
The functions of the DISPLAY switch are as follows:
ON: Text and messages describing the camera settings and operating status may be displayed on the viewfinder screen.
OFF: Status messages will not appear on the viewfinder screen.
MENU: Menus for camera settings will be displayed on the viewfinder screen.

⓬ MENU SELECT switch
The functions of the MENU SELECT switch are as follows:
ENTER: Confirm the menu or page selected using the MENU SELECT control, or confirm setting values.
CANCEL: Cancel menu setting values or return to page select mode or the top menu.

⓭ MENU SELECT control
Used to select menu items or change setting values in the menus displayed on the viewfinder screen.

⓮ Assignable switch
You can assign a function, such as lens extender ON/OFF, using the OPERATION menu.

⓯ VF DETAIL (viewfinder detail adjustment) switch
ON: Emphasizes the contours of the image on the viewfinder screen. When the switch is set to this position, you can adjust the amount of detail using the VF DETAIL control.
OFF: Disables contour emphasis.

⓰ VF DETAIL (viewfinder detail) control
Adjust the amount of detail of the picture on the viewfinder screen when the VF DETAIL switch is set to ON. This has no effect on the output signal of the camera.
Note
The viewfinder detail control function has no effect on a return video signal.

⓱ CALL button
- Press to call the operator of the HDCU-900 Camera Control Unit, the MSU-700A/750 Master Setup Unit, or the RCP-700 series Remote Control Panel. When pressed, the camera's red tally lamp will light up if previously off, and turn off if previously on. The CALL button on the MSU-700A/750 Master Setup Unit or RCP-700 series Remote Control Panel will light up, and their buzzer will sound.
- When the CALL button on the RCP-700 series Remote Control Panel or the MSU-700A/750 is pressed, this button will light up.

⓲ CURSOR (cursor memory) 1, 2, and 3 buttons
Used to store the size and position of the box cursor displayed on the viewfinder screen. Three different box cursor settings may be stored in memory using buttons 1, 2, and 3. Pressing one of these buttons will cause a cursor of the stored size to be displayed in the stored position.
Note
When one of the CURSOR buttons is lit up, the HPOSI, V-POSI, WIDTH, and HEIGHT buttons will be disabled.

⓳ Back tally lamp
This lamp lights red when the red tally signal is supplied. When the CALL button on the MSU-700A/750 Master Setup Unit or the RCP-700 series Remote Control Panel is pressed, the lamp lights if previously off or goes off if previously on. The brightness of the lamp may be adjusted using a control provided in the camera.
Attach a supplied number plate (0 through 9) to display the camera number. Lights green when the green tally signal is supplied.

⓴ Memory Stick media card section
Insert a Memory Stick media card into the slot. The lamp lights while writing or reading data to/from a Memory Stick media card.

㉑ RETURN SELECT knob 1
This knob selects from the four return signals from the CCU. By pressing in the RET 1 button, you can view the selected return video signal in the viewfinder.

㉒ RETURN SELECT knob 2
This knob selects from the four return signals from the CCU. By pressing in the RET 2 button, you can view the selected return video signal in the viewfinder.

㉓ RET 1 button
By pressing in this button, you can view the return video signal selected by the RETURN SELECT knob 1, in the viewfinder. Pressing this button again will switch the viewfinder screen display and MONITOR output back to the camera's video signal.

㉔ RET 2 button
By pressing in this button, you can view the return video signal selected by the RETURN SELECT knob 2, in the viewfinder. Pressing this button again will switch the viewfinder screen display and MONITOR output back to the camera's video signal.
Note
If both the RET 1 and RET 2 buttons are pressed, RET 1 will be displayed.

㉕ CURSOR STORE button
Press this button to store the size and position of the box cursor in memory.
Note
If the CURSOR ON button is not lit, box cursor information will not be stored.

㉖ CURSOR ON button
When this button is pressed, the button will light up and the box cursor will be displayed on the viewfinder screen. When the button is pressed again, the light will go off and the box cursor will disappear.

㉗ HEIGHT control
Adjust the height of the box cursor displayed on the viewfinder screen within the effective resolution area.

㉘ V-POSI (vertical position) control
Adjust the vertical position of the box cursor displayed on the viewfinder screen within the effective resolution area.

㉙ WIDTH control
Adjust the width of the box cursor displayed on the viewfinder screen within the effective resolution area.

㉚ H-POSI (horizontal position) control
Adjust the horizontal position of the box cursor displayed on the viewfinder screen within the effective resolution area

㉛ VF (viewfinder) connector (D-sub 25-pin)
Connect to the viewfinder CAMERA connector.

㉜ INTERCOM 1 and 2 connectors (XLR 5-pin)
- Connects to an XLR 5-pin headset. The INTERCOM 1 connector may be used for communications even when the power to the camera is turned off by the HDCU-900 Camera Control Unit. Installing the BKP-7913 RTS Intercom System Kit (option) allows the INTERCOM 2 connector to work with an RTS intercom system, and be connected to up to two channel devices.
- These connectors may also be used for monitoring a VTR playback audio signal when the HDC-900 is used as a stand-alone unit.

㉝ INTERCOM PROD/ENG (intercom producer/engineer line select) switch
Used to switch intercom channel 1 or 2 between producer and engineer lines.
PROD: Use the producer line.
ENG: Use the engineer line.

㉞ INTERCOM volume control
Adjust the intercom output level.

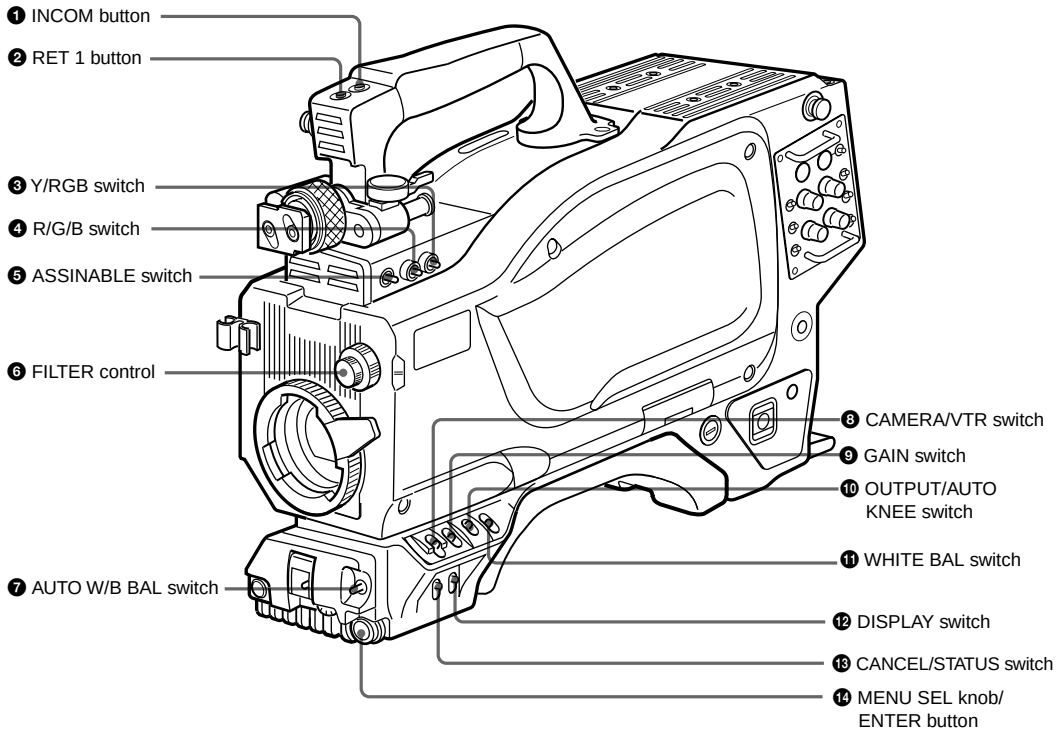
㉟ PGM 1/2 (program audio select) switch
Used to switch between program audio 1 and 2.

㊱ PGM (program) volume control
Adjust the program audio output level.

㊲ MIC (microphone) ON/OFF switch
Turn the headset microphone on or off.

7-2. HDC-950/930, HD Color Video Camera

7-2-1 *Front Right Side*



❶ INCOM (intercom 1) button
The intercom 1 microphone is turned ON while this button is pressed.

❷ RET 1 (return video 1) button
The return video 1 signal from the camera control unit is monitored on the viewfinder screen while this button is pressed. It is the same function as with the RET 1 buttons on the sides.

❸ Y/RGB switch
Select the video signal output for the VF and TEST OUT connectors.
Y: Output is the Y signal (this is the power-on default).
RGB: Output is the component video signal(s) selected by the R/G/B switch.

❹ R/G/B (red/green/blue) switch
When the Y/RGB switch is set to RGB, select the component video signal(s) to be provided as output to the VF and TEST OUT connectors.

❺ ASSINABLE switch
You can assign a function using the OPERATION menu.

❻ FILTER (internal filter selection) control
Used to select an internal filter appropriate for the light source illuminating the subject.

ND filter		Color temperature conversion filter	
1	Clear	A	Cross filter
2	1/4ND	B	3200K
3	1/8ND	C	4200K
4	1/16ND	D	6300K
5	1/64ND	E	8400K

❼ AUTO W/B BAL (white and black balance automatic adjustment) switch1)
Used to automatically adjust white and black balance.
WHT: Automatically adjust white balance.
BLK: Automatically adjust black balance.

❽ CAMERA/VTR (switch1)
Used to select control signals sent to a VTR connected to the camera. The operation of the VTR at the start of recording for each setting is shown in the table below.

CAMERA	VTR	Function
OFF	SAVE	Turn off the camera power.
ON	SAVE	Camera power is on. When the VTR START button is pressed, recording will begin after a few seconds.
ON	STBY	Turn on the camera power. When the VTR START button is pressed, recording will begin immediately.

❾ GAIN (switch1)
Used to select the gain of the video amplifier based on lighting conditions. The gain values for the L, M, and H settings may be set using the menus. When shipped

from the factory, the values set are L = 0 dB, M = 6 dB, and H = 12 dB.
When the MESSAGE setting on the VF DISPLAY page of the OPERATION menu is set to ON, the newly selected gain value will be displayed in the setting change/adjustment progress message display area of the viewfinder screen for three seconds when the gain setting is changed using this switch.
Example
"GAIN: 12 dB"

❿ OUTPUT (output signal selection)/AUTO KNEE switch1)
Used to select the signal (color bar signal or camera's video signal) to be used as output to a VTR, the viewfinder, or a video monitor. When the camera's video signal is being used as output, the auto knee function may be used. The relationship between the switch setting and the output signal and auto knee function is shown in the table below.

OUTPUT	AUTO KNEE	Function
BARS	OFF	Output is a color bar signal.
CAM	OFF	Output is the camera's video signal. The auto knee circuit is disabled.
CAM	ON	Output is the camea's video signl. The auto knee circuit is enable.

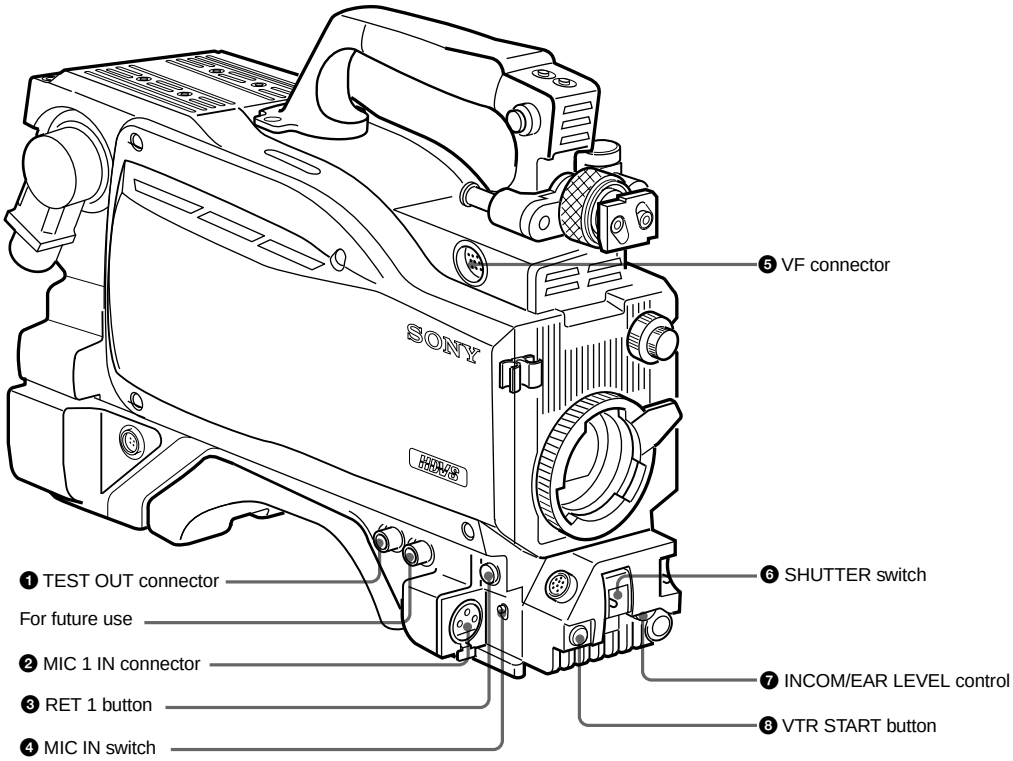
⓫ WHITE BAL (white balance memory selection) switch1)
Used to select the white balance adjustment method, or the memory used to store the adjusted value.
PRST (preset): White balance is adjusted to a preset value corresponding to a color temperature of 3200K.
A or B: Selects memory A or B. When the AUTO W/B BAL switch is set to WHT, the white balance will be automatically adjusted according to the setting of the FILTER control. The adjusted value will be stored in the selected memory. Each memory can store up to four adjusted values, for a total of 8.
When the MESSAGE setting on the VF DISPLAY page of the OPERATION menu is set to ON, the new setting will be displayed in the setting change/adjustment progress message display area of the viewfinder screen for three seconds when the setting is changed using this switch. Example: "WHITE: Ach" or "WHITE: PRESET"

⓬ DISPLAY switch
You can turn on or off the displays (safety zone marker, center marker, text displays) and menu screens on the viewfinder screen.
ON: Text describing the camera's operation status will be displayed on the viewfinder screen.
OFF: All viewfinder screen displays will be turned off.
MENU: Setup menus will be displayed on the viewfinder screen.

⓭ CANCEL/STATUS switch
When a menu is displayed on the viewfinder screen, pressing this button will cancel any changed setting and return the display to the previous menu. When menus are not displayed on the viewfinder screen, pressing this button will display the '!'IND item.

⓮ MENU SEL (menu select) knob/ENTER button (rotary encoder)
Used to select settings from menus displayed on the viewfinder screen (by rotating the knob) and to confirm settings (by pushing the button).

7-2-2 *Front Left Side*



❶ TEST OUT (test output) connector (BNC type)
Connect to a monitor as necessary. The output will be the signal selected with the Y/RGB and R/G/B/ switches.

❷ MIC 1 IN (microphone 1 input) connector (XLR 3-pin, female)
Connect a microphone. This connector and the AUDIO IN CH-1 connector on the back are alternately activated with the MIC IN switch.

❸ RET 1 (return video 1) button
The return video 1 signal from the camera control unit is monitored on the viewfinder screen while this button is pressed. It is the same function as with the RET 1 buttons on the grip and right side.

❹ MIC IN (microphone input) switch
Select either the microphone connected to the MIC 1 IN connector or that connected to the AUDIO IN CH-1 connector on the back.
+48V/FRONT: To use the microphone connected to the MIC1 IN connector and supply a power of +48 V to the microphone.
OFF/FRONT: To use the microphone connected to the MIC1 IN connector without supplying a power.
REAR: To use the microphone connected to the AUDIO IN CH-1 connector on the back. Whether or not to supply a power to the microphone can be set with the exclusive microphone power switch of the AUDIO IN CH-1 connector.

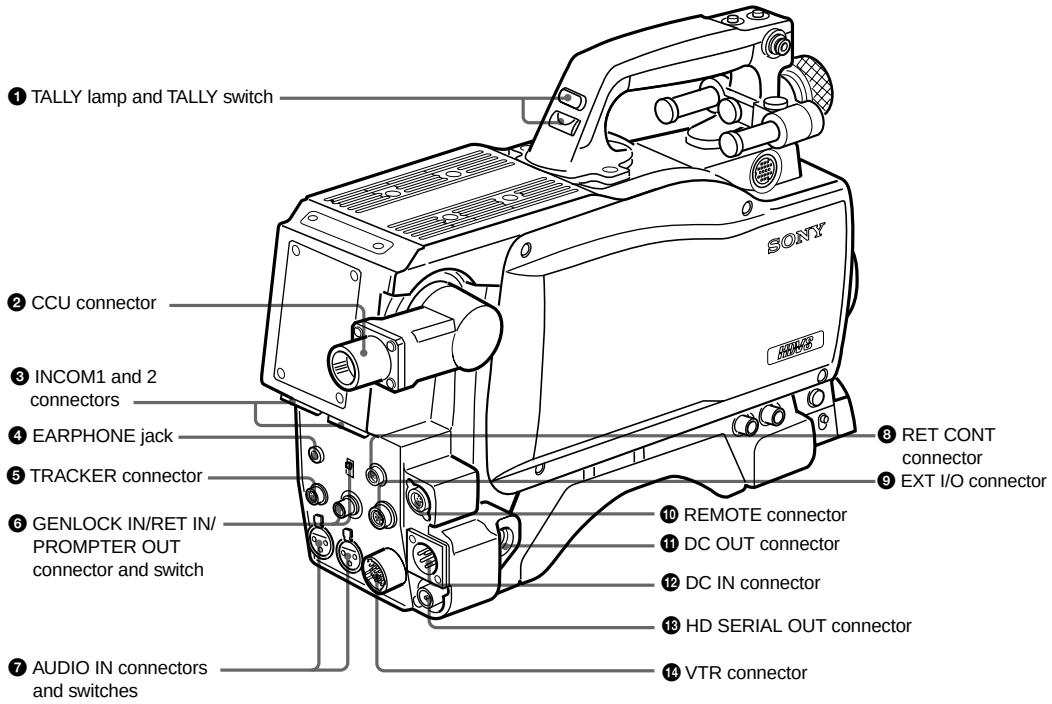
❺ VF (viewfinder) connector (20-pin)
Connect the viewfinder cable.

❻ SHUTTER switch1)
OFF: An electronic shutter does not function.
ON: An electronic shutter is activated.
SEL: The shutter speed and shutter mode change each time the switch is set to this position.

❼ INCOM/EAR (intercom/earphone) LEVEL control
To adjust the intercom/earphone volume level. The intercom level adjustment is enabled when the INCOM 1/2 LEVEL switches on the right back panel are set to "F."

❽ VTR START (recording start/stop) button
When a VTR is connected, recording begins when this button is pressed, and stops when it is pressed again. This button functions the same as the VTR button on the lens.
When a camera control unit is connected, the function of this button can be changed to the RET2/INCOM1 MIC/INCOM2 MIC ON/OFF function on using the OPERATION menu.

7-2-3 *Back Left Side*



❶ TALLY lamp and TALLY switch
ON: The tally lamp lights when a tally signal or a call signal generated by pressing a CALL button is received.
OFF: The tally lamp is prevented from lighting.

❷ CCU (Camera Control Unit) connector (optical multi connector)
Connects to a camera control unit via an optical electro-composite cable.

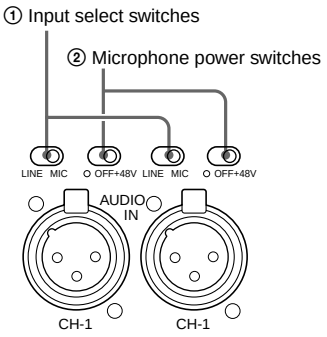
❸ INCOM1 and 2 (intercom 1 and 2) connectors (XLR 5-pin)
Used for input and output of intercom audio signals.

❹ EARPHONE jack (minijack)
Connect an earphone or headset for output of the VTR playback audio signal.

❺ TRACKER connector (20-pin)
Used for communication between the camera operator and tracker and for intercom 1 and 2 connection. This also supplied the up tally and program audio signals. The TRUNK LINE input/output signals are also assigned.

❻ GENLOCK IN/RET IN/PROMPTER OUT (external gen-lock signal input/return video signal input/ prompter signal output) connector (BNC type) and switch
Set the switch according to the signal at the connector.
GENLOCK IN: For input of an external gen-lock signal (valid in stand-alone use only)
RET IN: For input of the return video signal (valid in stand-alone use only)
PROMPTER OUT: Used for output of a prompter signal (valid only when a camera control unit is connected)

❼ AUDIO IN (audio input 1, 2) connectors (BNC type) and switches
Connect audio signals. An input select switch and microphone power switch are provided for each channel.



① Input select switch: Set to the appropriate position according to the connected equipment.
LINE: When a line-level signal source is connected
MIC: When a microphone is connected
② Microphone power switch:
When a microphone is connected, set whether or not to supply power to the microphone.
+48V: To supply a power of +48 V
OFF: Not to supply a power

Note
To supply a power of +12 V, modification of the camera is required. For details, refer to the Installation & Maintenance Manual. Note that the modification must be performed by service personnel only.

❽ RET CONT (return control) connector (6-pin)
Used for connection to a CAC-6 Return Video Selector.

❾ EXT I/O (external input and output) connector (20-pin)
Used to supply signals, such as Y/Pb/Pr signals, to external equipment.

❿ REMOTE connector (8-pin)
Used for connection to an RM-B150 Remote Control Unit, RCP-700-series Remote Control Panel or MSU-700A/750 Master Setup Unit.

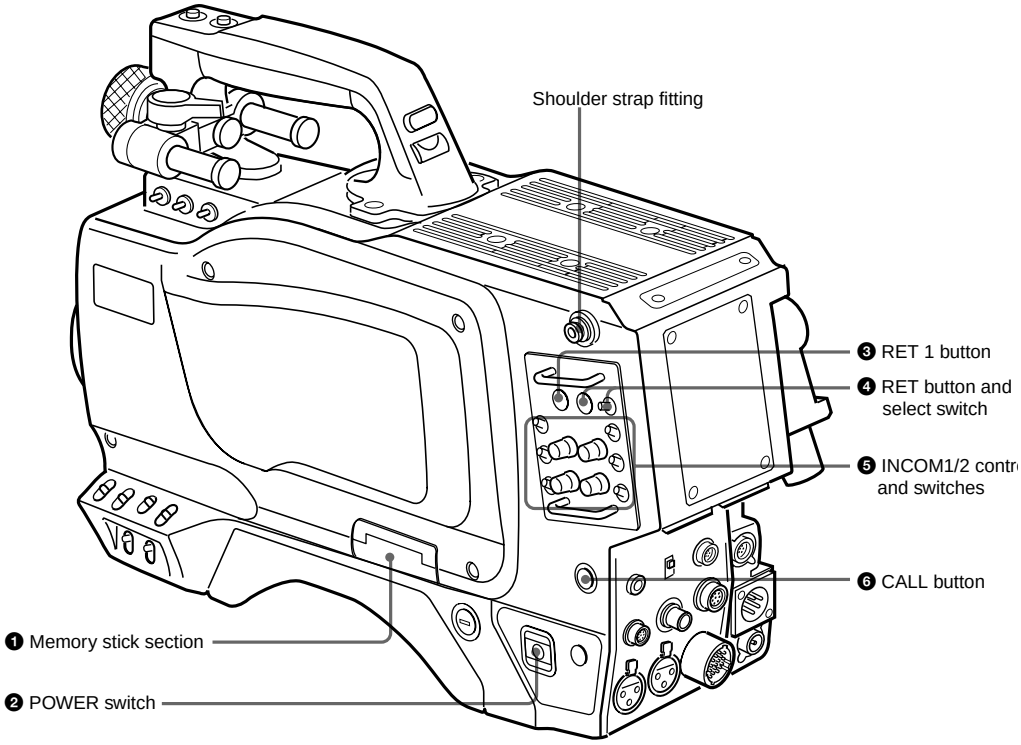
⓫ DC OUT (DC power supply output) connector (4-pin)
Used to supply power to devices such as a wireless receiver (optional).

⓬ DC IN (DC power supply input) connector (XLR 4-pin)
Used for connection to the AC-550/550CE AC Adaptor, a battery etc. to supply power to the camera.

⓭ HD SERIAL OUT connector (BNC type)
Used for output of HD SDI serial data.

⓮ VTR connector (26-pin)
Used for connection to a VTR (such as the HDW-250) or HDCD-50 HD Signal Distributor.

7-2-4 *Back Right Side*



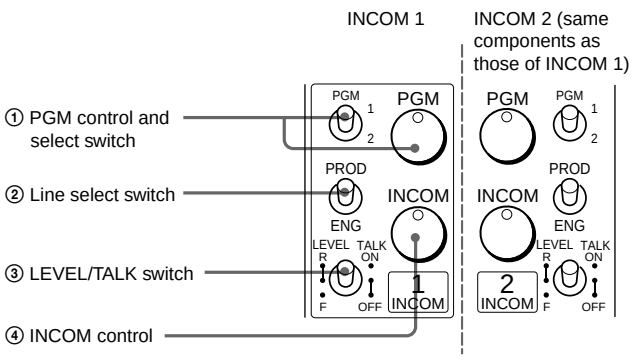
❶ Memory Stick media card section
A slot to accommodate a Memory Stick media card and an eject button to remove the stick are provided behind the panel. The eject button lights in red while writing or reading data to/from a Memory Stick media card.
Note
Do not insert/remove the memory stick when the eject button lights.

❷ POWER switch
CCU: Power supply will be received from the camera control unit.
EXT: Power supply will be received through the DC IN or VTR connector.

❸ RET 1 (return video 1) button
The return video 1 signal from the camera control unit is monitored on the viewfinder screen while this button is pressed.

❹ RET (return video) button and select switch
When other return video systems are used in addition to return video 1, you can monitor the signal (return video 2, 3, or 4) selected using the selector on the viewfinder screen while pressing the button.
Note
The RET 1 button has priority over the RET button if both buttons are pressed.

❺ INCOM1 and 2 controls and switches
There are a PGM control incorporated with a select switch, a line select switch, a LEVEL/TALK switch, and INCOM control each for intercom lines 1 and 2.

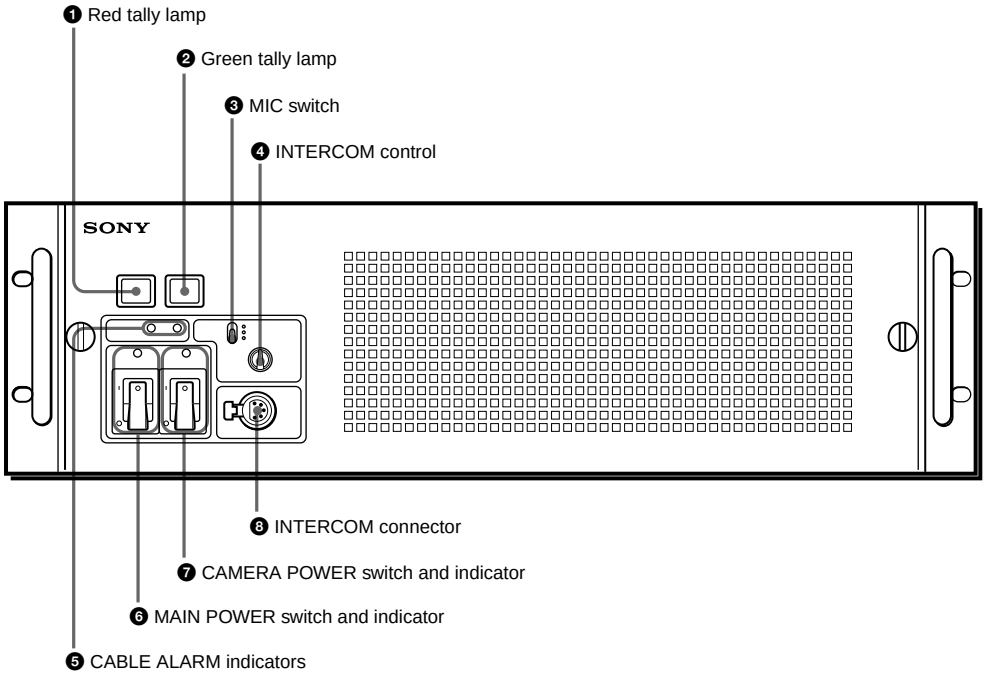


① **PGM (program) control and switch**: Adjust the program audio reception level. Select program 1 or 2 with the switch.
② **Line select switch**: Select the intercom line.
PROD: Producer line
ENG: Engineer line
③ **LEVEL/TALK switch**:
R/ON: The intercom headset microphone is turned on. The intercom audio reception level is adjusted with the INCOM control.
R/OFF: The intercom headset microphone is turned off. The intercom audio reception level is adjusted with the INCOM control.
F/OFF: The intercom headset microphone is turned off. The intercom audio reception level is adjusted with the INCOM/EAR LEVEL control on the front of the camera.
④ **INCOM (intercom) control**: Adjusts the intercom audio reception level.

❻ CALL button
When you press this button, the red tally lamp of the RCP-700-series Remote Control Panel or the MSU-700A/750 Master Setup Unit, will light. Use to call the operator of the RCP or MSU.

7-3. HDCU-900, HD Camera Control Unit

7-3-1 *Front Panel*



❶ Red tally lamp
Lights when a red tally signal is received. When the CALL button on the video camera, MSU-700A/750 Master Setup Unit, RCP-700 series Remote Control Panel, etc. is pressed, this lamp will go out if previously lit, and light up if previously off. A supplied number plate may be mounted here.

❷ Green tally lamp
Lights when a green tally signal is received. A supplied number plate may be mounted here.

❸ MIC (microphone selection) switch
Used to select the type of headphone microphone being used, or to turn the microphone input off.
DYNAMIC: for a dynamic microphone
OFF: to turn the microphone input off
CARBON: for a carbon microphone
Note
The intercom line is selected via a switch on the internal AT board.

❹ INTERCOM (intercom volume adjustment) control
Adjusts the intercom input level.
Note
The program audio mix volume is adjusted using the internal AT board.

❺ CABLE ALARM indicators
SHORT (red): This indicator lights when there is a short circuit between a power supply line and the sheath of the optical fiber cable, or when the two power supply lines are shorted. When this indicator lights, the power supply is shut off.
OPEN (red): Lights when there is not a camera connected via an optical fiber cable to the CAMERA connector on the rear panel. It flashes to warn about insufficient optical reception status of the optical fiber cable.

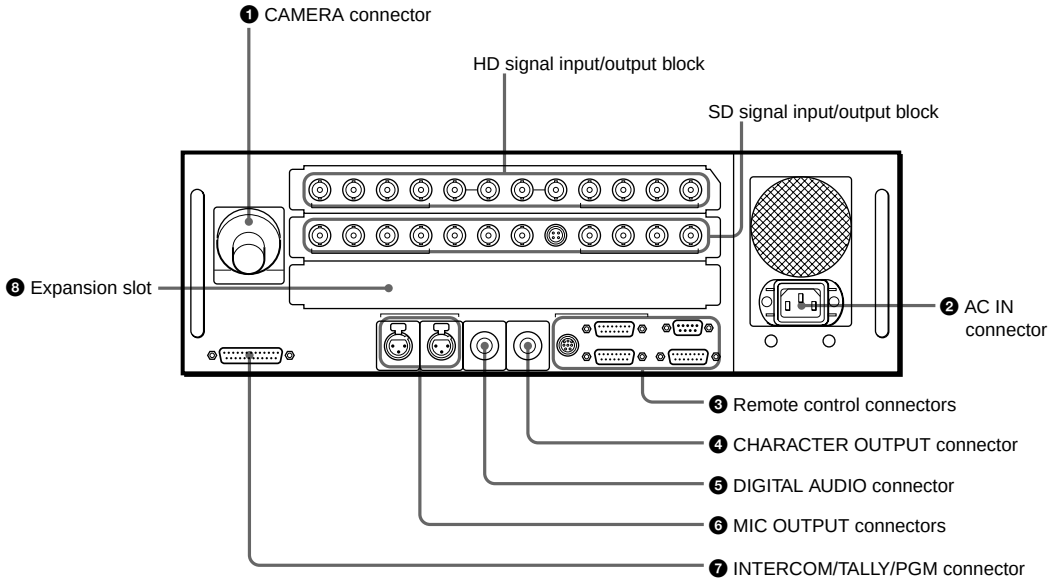
❻ MAIN POWER switch and indicator
Turns on or off the power to the entire system, consisting of the HDCU-900, a video camera, an RCP-700 series Remote Control Panel connected via the REMOTE connector, etc. Setting the switch to the " "

position turns the power on, and setting it to " " turns it off. The indicator lights when the power supply is on.

❼ CAMERA POWER switch and indicator
Turns on or off the power to the camera when the MAIN POWER switch is on. Setting the switch to the " I" position turns the power on, and setting it to "O " turns it off. When a remote control panel is connected and the power supply is turned off with the CAM PW button on the remote control panel, this switch alone cannot turn on the video camera power.

❽ INTERCOM connector (XLR 5-pin)
Connects to a headset.
Note
To use a headset with a plug other than an XLR 5-pin plug, consult a Sony service or sales representative.

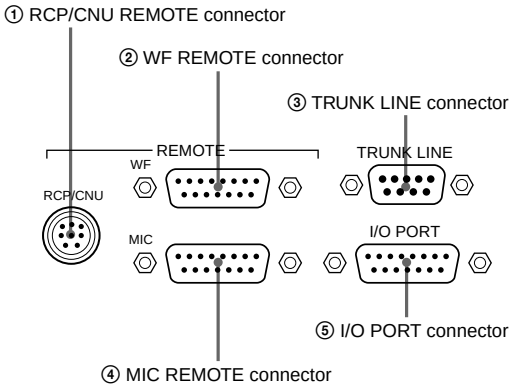
7-3-2 *Rear Panel*



❶ CAMERA connector (optical fiber connector)
Used to connect a video camera, using an optical fiber cable such as the FC2-PD50/PD250. All video camera signals, including power supply, control, video, and audio, are sent and received over one optical fiber cable.
Note
Dust on the connection surface of the optical fiber cable may result in transmission errors. When not connected, always cover the end with the supplied cap.

❷ AC IN (AC power supply input) connector
Use the supplied power cord to connect to an AC power supply. The power cord may be secured to the HDCU-900 body using the supplied plug holder.

❸ Remote control connectors



① RCP/CNU REMOTE connector (8-pin)
Used to connect to an MSU-700A/750 Master Setup Unit, CNU-500/700 Camera Command Network Unit, or RCP-700 series Remote Control Panel via a CCA-5 Connection Cable. Control signals are sent and received via this connector. When using an RCP-700 series unit, power is also supplied.
② WF MODE REMOTE (waveform monitor remote) connector (D-sub 15-pin)
Used to attach to the appropriate connector on a waveform monitor when operating the waveform monitor display using an MSU-700A/

750 Master Setup Unit or RCP-700 series Remote Control Panel. Either a recall-type monitor, or the 1730HD/1735HD Waveform Monitor, may be connected. When using a recall-type monitor, preset a display mode on the waveform monitor, and then recall the mode externally. Switches on the AT board are used to select either recall type or 1730HD/1735HD type operation.

③ TRUNK LINE connector (D-sub 9-pin, RS- 232C)
Used to connect the HDCU-900 to the TRACKER connector on an HDC-900 HD Color Video Camera via an RS-232C interface. Used mainly for communication with equipment on the camera side. The RXD, TXD, RTS, and CTS signals can be transferred at up to 19.2 kbps using this connector.

④ MIC REMOTE (microphone remote) connector (D-sub 15-pin)
Using this connector, the video camera's microphone input level may be set by external equipment such as an audio mixer, in five steps (–60, –50, –40, –30, and –20 dB). When taping, set the volume to a level appropriate for the audio conditions.

⑤ I/O PORT connector (D-sub 15-pin)
Used for remote control using an external control device.

Note
Use of a case wider than 42 mm can cause interference at connectors 2, 4, 5. It is recommended to use JAE-made DA-C1-J10.

❹ CHARACTER OUTPUT connector (BNC type)
Used to output the results of the HDCU-900 diagnostic self-test in SD black and white analog video format.

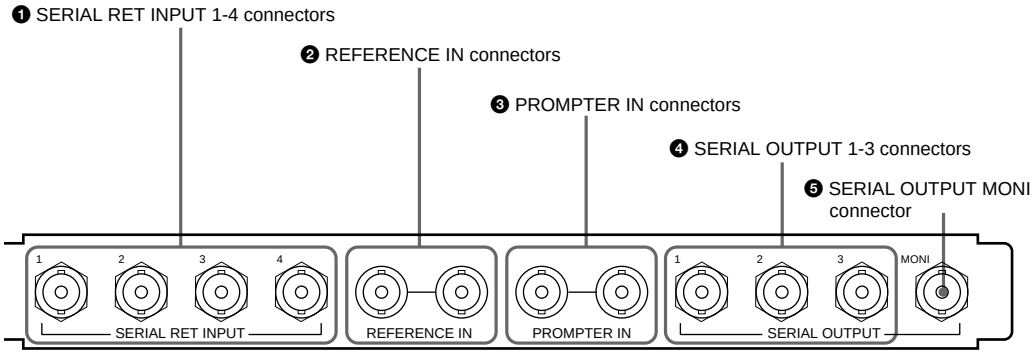
❺ DIGITAL AUDIO connector (BNC type)
Used to output a digital audio signal input to the camera.

❻ MIC OUTPUT (microphone output) connectors (XLR 3-pin)
Used for output of the microphone input to the video camera.

❼ INTERCOM/TALLY/PGM (program audio) connector (D-sub 25-pin)
Used for input and output of intercom, tally, and program audio signals. Connect to the intercom/tally/program audio connector of the intercom system.

❽ Expansion slot
For installation of the optional HKCU-901 SD Analog Interface Unit, HKCU-902 HD Analog Interface Unit, HKCU-903 Frame Rate Converter Unit, or HKCU-904 Line Converter Unit.

7-3-3 *HD Signal Input/Output Block*



❶ SERIAL RET INPUT 1-4 (HD-SDI return video 1, 2, 3, and 4 input) connectors (BNC type)
Four different HD-SDI return video input signals may be received independently. The selection of RET 1, 2, 3, or 4 is made by the camera's return switch. The type of input signal on RET 1, 2, 3, and 4 may be set individually using switches on the internal AT board, or using the MSU-700A/750 Master Setup Unit.

❷ REFERENCE IN connectors (BNC type)
Used to input an HD tri-level reference sync signal or SD reference sync signal (black burst signal). If loop-through output is not used, terminate the unused connector with 75 ohms.

Note
To use the VBS signal of the HKCU-901 (when SC phase lock is required), use an SD reference sync signal (black burst signal).

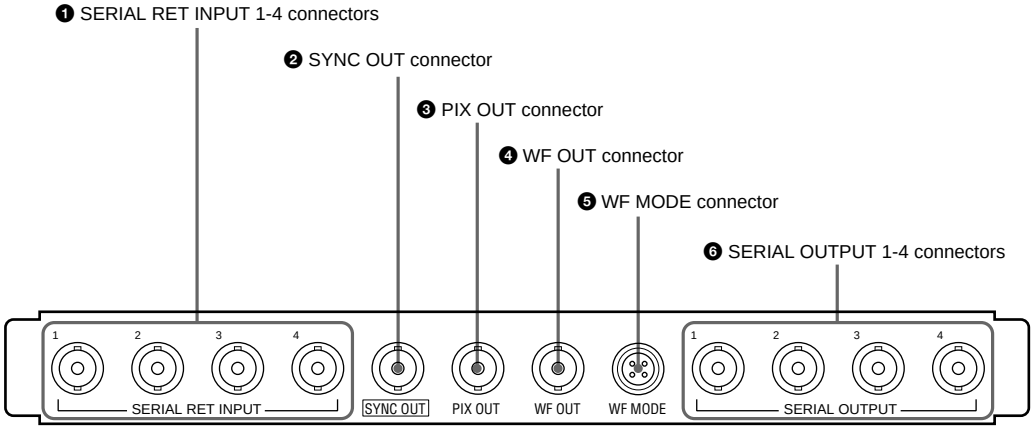
❸ PROMPTER IN connectors (BNC type)
Used for prompter signal input. If loop-through output is not used, terminate the unused connector with 75 ohms. If the signal used is a 1.0 Vp-p, 75-ohm signal, it may be output from the video camera PROMPTER OUT connector with a frequency bandwidth of 8 MHz, regardless of signal format.

❹ SERIAL OUTPUT 1-3 (HD-SDI 1, 2, and 3 output) connectors (BNC type)
The signal from the video camera may be output as three HD-SDI signals.

❺ SERIAL OUTPUT MONI (HD-SDI monitor output) connector (BNC type)
The signal from the video camera may be mixed with skin tone gate signals and some aspect marker signal and output in HD-SDI format.

7-3-4 *SD Signal Input/Output Block*

These connectors can be replaced with the optional HKCU-902/903/904.



❶ SERIAL RET INPUT 1-4 (SD-SDI return video 1, 2, 3, and 4 input) connectors (BNC type)

Four different SD-SDI return video input signals may be received independently when the system is operating with the field frequency of 59.94/50 Hz. The selection of RET 1, 2, 3, or 4 is made by the camera's return switch. The type of input signal on RET 1, 2, 3, and 4 may be set individually using switches on the internal AT board, or using the MSU-700A/750 Master Setup Unit. The aspect ratio may also be selected for SD signals.

❷ SYNC OUT (HD/SD sync signal output) connector (BNC type)

Used for output of an HD tri-level sync or SD composite sync signal from the internal sync signal generator. (Factory setting: HD tri-level sync)

❸ PIX OUT (picture monitor output) connector (BNC type)

Used for output of the picture monitor video signal selected using the RCP-700 series Remote Control Panel MONITOR SELECT button, or the MSU-700A/750 Master Setup Unit PICTURE MONITOR button. (When both the RCP and MSU are in use, this connector functions as the output connector for RCP control.)

❹ WF OUT (waveform monitor output) connector (BNC type)

Used for output of the waveform monitor video signal selected using the RCP-700-series Remote Control Panel MONITOR SELECT button, or the MSU-700A/750 Master Setup Unit WF MONITOR button. (When both the RCP and MSU are in use, this connector functions as the output connector for RCP control.)

Note

The SC phase of the VBS signal output from connectors 3 and 4 is not locked to the black burst signal supplied to the REFERENCE IN connector. Use the monitor in Internal sync mode.

❺ WF MODE (waveform monitor mode) connector (4-pin)

Connect to the appropriate connector on a waveform monitor when monitoring a signal in sequential mode. A sequence signal will be output when the SEQ button on the RCP-700 series Remote Control Panel is pressed, allowing simultaneous monitoring of the R, G, and B signals in sequential mode. (When both the RCP and MSU are in use, this connector functions as the output connector for RCP control.)

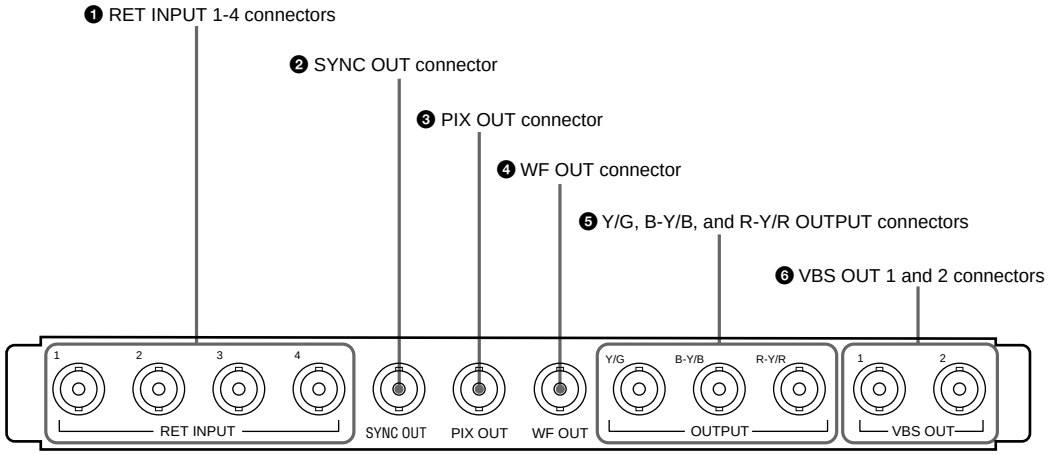
❻ SERIAL OUTPUT 1-4 (SD-SDI 1, 2, 3, and 4 output) connectors (BNC type)

When the system is operating with the field frequency of 59.94/50 Hz, the signal from the video camera may be down converted and output as four SD component SDI signals.

7-3-5 *HKCU-901 SD Analog Interface Unit*

The optional HKCU-901 is - installed in the HDCU-900 expansion slot.

Note
All input and output connectors function when the system is operated at a 59.94/50 Hz field frequency, but do not operate when the system field frequency is 60 Hz.



❶ RET INPUT 1-4 (return video 1, 2, 3, and 4 input) connectors (BNC type)
Four different SD analog return video input signals may be received independently. The selection of RET 1, 2, 3, or 4 is made by the camera's return switch. The type of input signal on RET 1, 2, 3, and 4 may be set individually using switches on the AT board in the HDCU-900, or using the MSU-700A/750 Master Setup Unit. The aspect ratio may also be selected for SD signals.

Note
If a signal asynchronous with the HDCU-900 is supplied, the picture quality may be degraded.

❷ SYNC OUT (SD sync signal output) connector (BNC type)
Used for output of an SD composite sync signal from the internal sync signal generator.

❸ PIX OUT (picture monitor output) connector (BNC type)
Used for output of the picture monitor video signal selected using the RCP-700 series Remote Control Panel MONITOR SELECT button, or the MSU-700A/750 Master Setup Unit PICTURE MONITOR button. (When both the RCP and MSU are in use, this connector can be assigned to the output connector for MSU control.) Signal selection can be made using switches on the AT board.

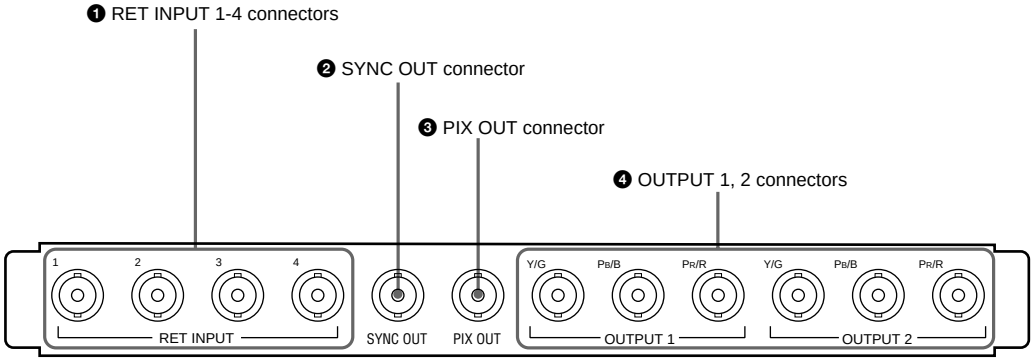
❹ WF OUT (waveform monitor output) connector (BNC type)
Used for output of the waveform monitor video signal selected using the RCP-700 series Remote Control Panel MONITOR SELECT button, or the MSU-700A/750 Master Setup Unit WF MONITOR button. (When both the RCP and MSU are in use, this connector can be assigned to the output connector for MSU control.) Signal selection can be made using switches on the AT board.

❺ Y/G, B-Y/B, and R-Y/R OUTPUT (component video signal output) connectors (BNC type)
Used for output of either Y, B-Y, R-Y component video or G, B, R component video signals. The type of signal is selected using switches on the AT board. (Factory setting: G, B, R)

❻ VBS OUT 1 and 2 (composite video output 1 and 2) connectors (BNC type)
The two connectors are for output of the video camera signal in analog composite video format.

7-3-6 *HKCU-902 HD Analog Interface Unit*

The optional HKCU-902 is designed to be installed in the HDCU-900 expansion slot or in place of the SD signal input/output block.



❶ RET INPUT 1-4 (return video 1, 2, 3, and 4 input) connectors (BNC type)
Four different HD analog return video input signals may be received independently. The selection of RET 1, 2, 3, or 4 is made by the camera's return switch. The type of input signal on RET 1, 2, 3, and 4 may be set individually using switches on the AT board in the HDCU-900, or using the MSU-700A/750 Master Setup Unit.

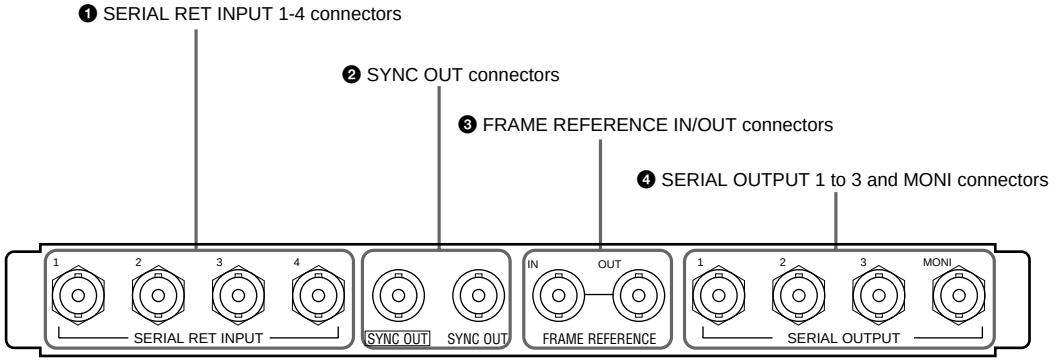
❷ SYNC OUT (HD sync signal output) connector (BNC type)
Used for output of an HD tri-level sync signal from the internal sync signal generator.

❸ PIX OUT (HD picture monitor output) connector (BNC type)
Used for output of the picture monitor video signal selected using the RCP-700 series Remote Control Panel MONITOR SELECT button, or the MSU-700A/750 Master Setup Unit PICTURE MONITOR button. Either the Remote Control Panel or Master Setup Unit may control the output, depending on which button was pressed most recently.

❹ OUTPUT 1, 2 (HD analog component video 1 and 2 output) connectors (BNC type)
HD analog component video signals are output in either Y, PB, PR or G, B, R format. The selection of Y, PB, PR or G, B, R format may be made independently for OUTPUT 1 and OUTPUT 2, using switches on the AT board. (Factory setting: G, B, R)

7-3-7 *HKCU-903 Frame Rate Converter Unit*

The optional HKCU-903 is to be installed in the HDCU-900 expansion slot or in place of the SD signal input/output block.



❶ SERIAL RET INPUT 1-4 (HD-SDI return video 1, 2, 3, and 4 input) connectors (BNC type)
Four different HD-SDI return video input signals may be received independently. The selection of RET 1, 2, 3, or 4 is made by the camera's return switch. The type of input signal on RET 1, 2, 3, and 4 may be set individually using switches on the AT board in the HDCU-900, or using the MSU-700A/750 Master Setup Unit.

❷ SYNC OUT (HD/SD sync signal output) connectors (BNC type)
The left connector outputs a sync signal of the same format as that of the input/output block in the above slot. The right connector outputs the HD tri-level sync signal of the same format as that of the SERIAL OUTPUT 1 to 3 connectors.

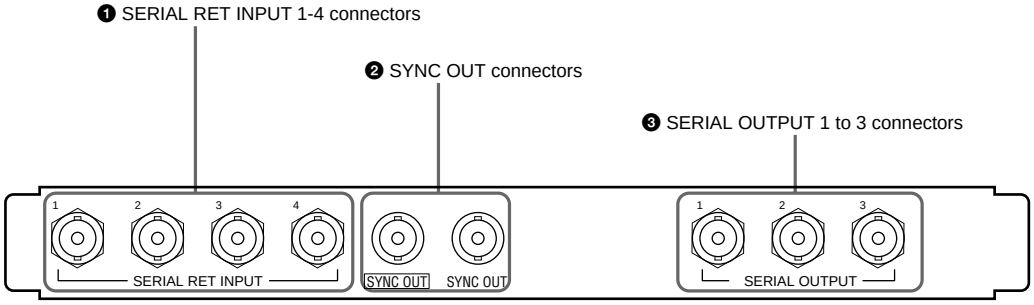
❸ FRAME REFERECE IN/OUT connectors (BNC type)
The IN connector is used to receive an HD tri-level reference sync signal or SD reference sync signal (black burst signal) for frame sequence lock between camera control units. In this case, the signal supplied to the IN signal is output from the OUT connector as-is. When this unit is used as the master unit, these connectors can be used as the frame sync pulse output connectors for pull down. Switching is made using the switches on the internal FC board.

❹ SERIAL OUTPUT 1 to 3 and MONI (monitor) connectors (BNC type)
The 1 to 3 connectors output the signal from the camera as three HD-SDI signals. The MONI connector outputs the signal from the video camera mixed with skin tone gate signals and some aspect marker signal in HD-SDI format.

7-3-8 *HKCU-904 Line Converter Unit*

The optional HKCU-904 is to be installed in the HDCU-900 expansion slot or in place of the SD signal input/output block.

Note
When used in combination with the HKCU-903, mount the HKCU-903 into the second slot from the top, and the HKCU-904 into the third slot.



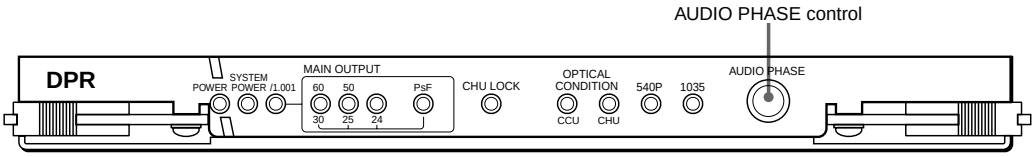
❶ SERIAL RET INPUT 1-4 (HD-SDI return video 1, 2, 3, and 4 input) connectors (BNC type)
Four different HD-SDI analog return video input signals (720/60P) may be received independently. The selection of RET 1, 2, 3, or 4 is made by the camera's return switch. The type of input signal on RET 1, 2, 3, and 4 may be set individually using switches on the AT board in the HDCU-900, or using the MSU-700A/750 Master Setup Unit.

❷ SYNC OUT (HD/SD sync signal output) connectors (BNC type)
The left connector outputs a sync signal of the same format as that of the input/output block in the above slot. The right connector outputs the HD tri-level sync signal of the same format as that of the SERIAL OUTPUT 1 to 3 connectors.

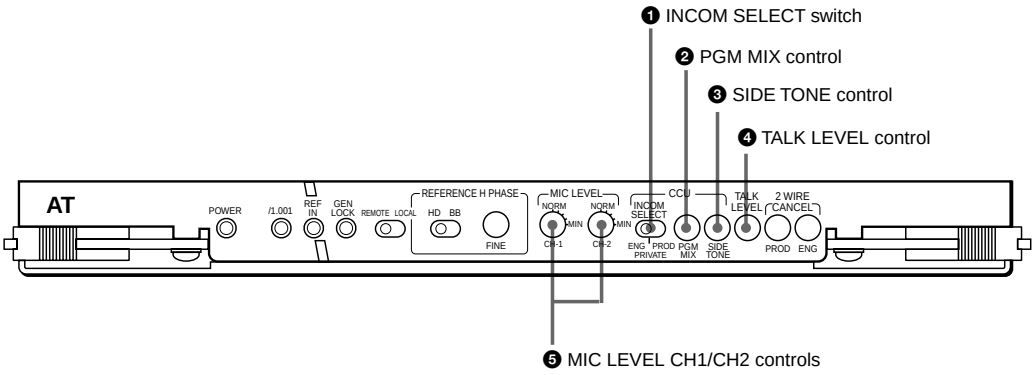
❸ SERIAL OUTPUT 1 to 3 connectors (BNC type)
The 1 to 3 connectors output the signal from the camera as three HD-SDI signals (720/60P).

7-3-9 *Internal Boards – DPR board*

AUDIO PHASE control
Adjusts the delay of the audio signal with respect to the video signal output from this unit. (1 step=5 ms, 1-frame delay: 30 frames/s=7, 25 frames/s=8)



7-3-10 *Internal Boards – AT board*



❶ INCOM SELECT (intercom select) switch
Selects the intercom line to which the intercom signal to be connected via the intercom connector of this unit.
PROD: producer line
PRIVATE: private line
ENG: engineer line

❷ PGM MIX (program mix) control
Controls the volume of program audio to be mixed to the intercom signal at the headset.

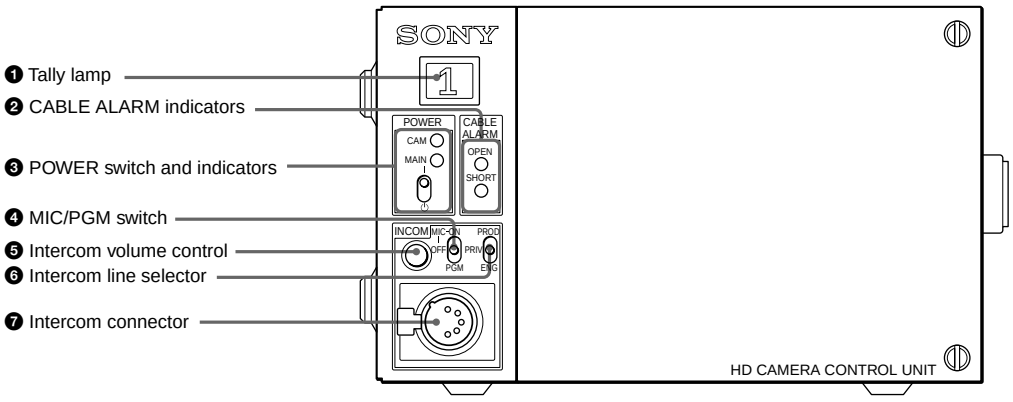
❸ SIDE TONE control
Controls the volume of your voice to be supplied to the receiver of the headset.

❹ TALK LEVEL control
Controls the volume of your voice to be sent to the producer line, engineer line, and headset of the camera.

❺ MIC LEVEL CH1/CH2 (CH1/CH2 microphone level) controls
Control the input level according to the sensitivity of the microphone connected to the MIC connector of the camera so that an appropriate sound volume is obtained.

7-4. HDCU-950, HD Camera Control Unit

7-4-1 *Front Panel*



❶ Tally lamp
The lamp lights in red when a red tally signal is received. When the CALL button on the camera, MSU-700A/750 Master Setup Unit, RCP-700-series Remote Control Panel, etc. is pressed, this lamp will go dark if previously lit, and light up if previously off. It lights in green when a green tally signal is received. A supplied number plate can be mounted here.

❷ CABLE ALARM indicators
OPEN (red): The LED lights when there is no camera connected via an optical fiber cable to the CAMERA connector on the rear panel. It flashes to warn about insufficient optical reception status of the optical fiber cable.
SHORT (red): The LED lights when there is a short circuit between a power supply line and the sheath of the optical fiber cable, or when the two power supply lines are shorted. When this indicator lights, the power supply to the camera is shut off.

❸ POWER switch and indicators
The switch turns on or off the power to the entire system, consisting of the HDCU-950, a video camera, an RCP-700-series Remote Control Panel connected via the REMOTE connector, etc. The MAIN and CAM (camera) indicators light when the power is turned on.

If the CAM PW button on the Remote Control Panel or Master Setup Unit is pressed, only power to the camera is turned off, and the CAM indicator alone goes dark.

Note

Standby power is kept supplied even when the POWER switch is set to off. The main power switch is provided on the power unit behind the front cover. If you open the front cover and set the main power switch to off, power cannot be turned on with the POWER switch on the front panel.

❹ MIC/PGM (microphone/program audio) switch

ON: To turn on the headset microphone

OFF: To turn off the headset microphone

PGM (program): To output the program audio to the intercom connector

❺ Intercom volume control

To adjust the intercom input level

❻ Intercom line selector

Select the intercom line to which the intercom signal is to be connected:

PROD (producer): Producer line

PRIV (private): The producer line and engineer line are disconnected, and communication is possible only between the HDCU-950 and the connected camera.

ENG (engineer): Engineer line

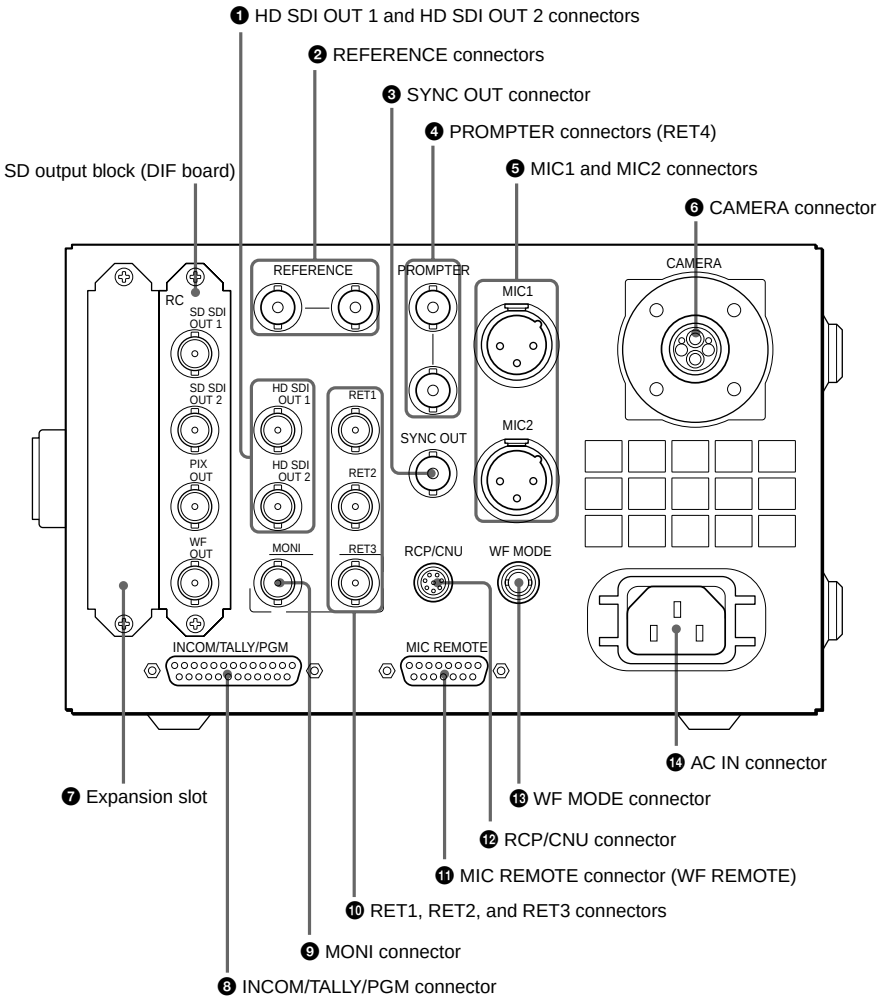
❼ Intercom connector (XLR 5-pin)

Connect a headset.

Note

To use a headset with a plug other than an XLR 5-pin plug, consult a Sony service or sales representative.

7-4-2 *Rear Panel*



❶ HD SDI OUT 1 and HD SDI OUT 2 (HD serial digital interface output 1 and 2) connectors (BNC type)

The signal from the video camera may be output as HD-SDI signals.

❷ REFERENCE connectors (BNC type)

Input an HD tri-level reference sync signal or SD reference sync signal (black burst signal) to either of the two connectors. The input signal is output from the other connector as-is (loop-through output). If loop-through output is not used, terminate the unused connector with 75 ohms. The type of reference signal is selected using the switch on the internal AT board, or using the MSU-700A/750 Master Setup Unit.

Note

To use the VBS signal of the HKCU-951 SD Encoder Unit (SC phase lock is required), use an SD reference sync signal (black burst signal).

❸ SYNC OUT (sync signal output) connector (BNC type)
Used for output of an SD composite sync signal or HD tri-level sync from the internal sync signal generator. (Factory setting: SD composite sync)

❹ PROMPTER connectors (BNC type)
Input a teleprompter signal to either of the two connectors. The input signal is output from the other connector as-is (loop-through output). If loop-through output is not used, terminate the unused connector with 75 ohms. If the signal used is a 1.0-Vp-p, 75-ohm analog signal, it may be output from the video camera's PROMPTER OUT connector with a frequency bandwidth of 8 MHz, regardless of signal format.
RET4 (return video input 4) connector
When required, either of the PROMPTER connectors can be assigned for the fourth return video input exclusively for analog VBS signals.

❺ MIC1 and MIC2 (microphone output 1 and 2) connectors (XLR 3-pin)
Used to output microphone signals from the video camera

❻ CAMERA connector (optical fiber connector)
Used to connect a video camera, using an optical fiber cable. All video camera signals, including power supply, control, video, and audio, are sent and received over one optical fiber cable.
Note
Dust on the connection surface of the optical fiber cable may result in transmission errors. When not connected, always keep the end covered with the supplied cap.

❼ Expansion slot
For installation of the optional HKCU-951 SD Encoder Unit. When using the HKCU-953 HD Frame Rate Converter Unit, move the DIF board and internal RC board to this slot and install the HKCU-953 in the original DIF/RC board position.

❽ INCOM/TALLY/PGM (intercom/tally/program audio) connector (D-sub 25-pin)
Used for input and output of intercom, tally, and program audio signals. Connect to the intercom/tally/program audio connector of the intercom system.

❾ MONI (HD-SDI monitor output) connector (BNC type)
The signal from the video camera can be mixed with skin tone gate signals and some aspect marker signal and output in HD-SDI format.
Note
Mixing is set to ON or OFF using switches on the internal AT board or the MSU-700A/750 Master Setup Unit.

❿ RET1, RET2, and RET3 (return video input 1, 2, and 3) connectors (BNC type)
Return video input signals can be received from three different systems. The selection among from RET 1, 2 and 3 is made using the camera's return video switch. The type of input signal can be any of HD-SDI, SD-component SDI, or analog VBS, and can be set using the switch on the internal DTX board, or using the MSU-700A/750 Master Setup Unit. Signals of different types cannot be connected simultaneously.
Note
If a signal asynchronous with the HDCU-950 is supplied, it may affect the picture quality of return video.

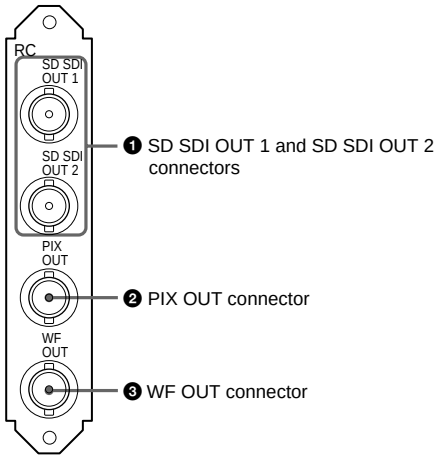
⓫ MIC REMOTE (microphone remote) connector (D-sub 15-pin)
Using this connector, the video camera's microphone amplifier gain can be set using external equipment such as an audio mixer, in five steps (60, 50, 40, 30, and 20 dB). When taping, set the volume to a level appropriate for the audio conditions.
Note
The microphone amplifier gain can also be set using switches on the internal AVP board.
WF REMOTE (waveform monitor remote) connector
With the internal switch setting, the MIC REMOTE connector can be assigned for the WF REMOTE connector. In this case, the connector can be connected to the appropriate connector on a waveform monitor when operating the waveform monitor using an MSU-700A/750 Master Setup Unit or RCP-700- series Remote Control Panel. A recall-type monitor can be connected. For the recall-type monitor, preset a display mode on the waveform monitor, and then recall the mode externally.

⓬ RCP/CNU connector (8-pin)
Used to connect to an MSU-700A/750 Master Setup Unit, CNU-500/700 Camera Command Network Unit, or RCP-700-series Remote Control Panel via a CCA-5 Connection Cable. Control signals are sent and received via this connector. When using an RCP-700-series unit, power is also supplied.

⓭ WF MODE (waveform monitor mode output) connector (4-pin)
Connect to the appropriate connector on a waveform monitor when monitoring a signal in Sequential mode. A sequence signal will be output when the SEQ button on the MSU-700A/750 Master Setup Unit or RCP-700 Series Remote Control Panel is pressed, allowing simultaneous monitoring of the R, G, and B signals in Sequential mode. (When both the RCP and MSU are in use, this connector functions as the output connector for RCP control.)

⓮ AC IN (AC power supply input) connector
Use the specified power cord to connect to an AC power supply. The power cord can be secured to the HDCU-950 body using an optional plug holder.

7-4-3 *Output Block - DIF Board*



❶ SD output block (DIF board) 1 SD SDI OUT 1 and SD SDI OUT 2 (SD-SDI output 1 and 2) connectors (BNC type)
When the system is operating with the field frequency of 59.94/50 Hz, the signals from the video camera may be down-converted to SD-component SDI signals and output from these connectors. The OUT 2 connector can be assigned for a digital monitor output that includes character and marker information.

❷ PIX OUT (picture monitor output) connector (BNC type)
Used for output of the picture monitor video signal selected using the RCP-700-series Remote Control Panel MONITOR SELECT button or the MSU-700A/750 Master Setup Unit PICTURE MONITOR button. (When both the RCP and MSU are in use, this connector functions as the output connector for RCP control.)

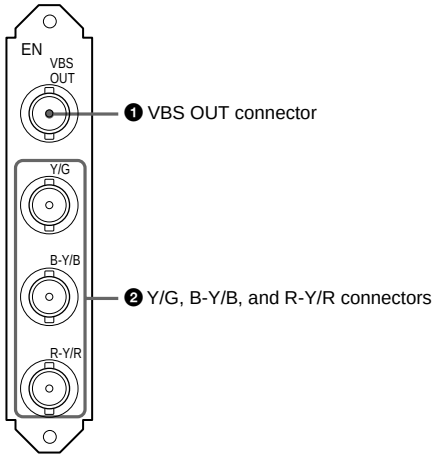
❸ WF OUT (waveform monitor output) connector (BNC type)
Used for output of the video signal for waveform monitoring selected using the RCP-700-series Remote Control Panel's MONITOR SELECT button or the MSU-700A/750 Master Setup Unit's WF MONITOR button. (When both the RCP and MSU are in use, this connector functions as the output connector for RCP control.)

Note
The SC phase of the VBS signal output from connectors 2 and 3 is not locked to the black burst signal supplied to the REFERENCE connector. Use the vector monitor in Internal Sync mode.

7-4-4 *HKCU-951 SD Encoder Unit*

The optional HKCU-951 is to be installed in the HDCU-950 expansion slot.

Connector panel (VDA board)



Note
All the connectors function when the system is operated at a 59.94-/50-Hz field frequency, but do not operate when the system field frequency is 60 Hz.

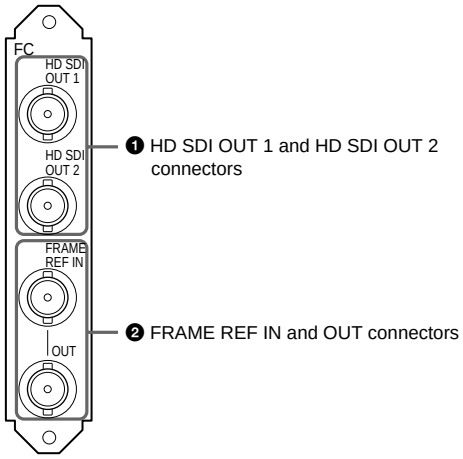
❶ VBS OUT (composite video signal output) connector (BNC type)
Used for output of the video camera signal in analog composite video format. An internal setting enables the SD SDI OUT1 and OUT2 connectors on the DIF board also to be used as analog VBS outputs.

❷ Y/G, B-Y/B, and R-Y/R (component video signal output) connectors (BNC type)
Used for output of either Y, B-Y, R-Y component video signals or G, B, R component video signals. The type of signal is selected using switches on the EN board. (Factory setting: G, B, R)

7-4-5 *HKCU-953 HD Frame Rate Converter Unit*

The optional HKCU-953 is to be installed in the slot for the DIF board (SD output block)/internal RC board after moving them to the expansion slot.

Connector panel (SDI board)

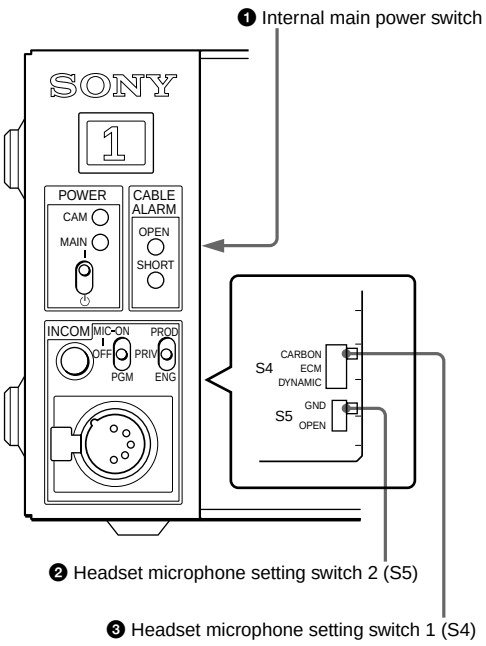


❶ HD SDI OUT 1 and HD SDI OUT 2 (HD SDI output 1 and 2) connectors (BNC type)
These connectors output the signals from the camera as HD-SDI signals. When the camera is operating in 24PsF mode, frame conversion can be applied to input signals to provide 60i/50i signals from these connectors.

❷ FRAME REF IN and OUT (frame reference input and output) connectors (BNC type)
The IN connector is used to receive an HD tri-level reference sync signal or SD reference sync signal (black burst signal) for frame sequence lock between camera control units. The signal supplied to the IN connector is output from the OUT connector as-is. When this unit is used as the master unit, the OUT connector can be used as the frame sync pulse output connector for pull down.

7-4-6 *Internal Switches and Internal Boards – Internal switches*

The following switches are located inside the unit behind the front panel:

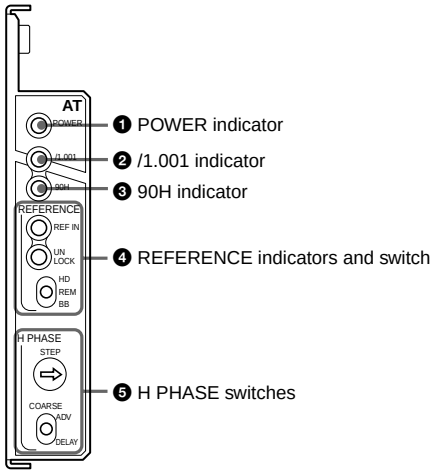


❶ Internal main power switch
When an abnormality has occurred, and power cannot be cut off with the POWER switch on the front panel, you may turn off the unit using the internal main power switch.

❷ Headset microphone setting switch 1 (S4)
Set the switch according to the microphone of the headset connected to the intercom connector on the front panel of this unit:
CARBON: Carbon microphone (power supply, 20- dB gain)
ECM: Electret condenser microphone (power supply, 40-dB gain)
DYNAMIC: Dynamic microphone (no power supply, 60-dB gain)

❸ Headset microphone setting switch 2 (S5)
When you set setting switch 1 (S4) to ECM or DYNAMIC, also set this switch accordingly:
GND: Unbalanced type
OPEN: Balanced type

7-4-7 *Internal Switches and Internal Boards – AT Board*



❶ POWER indicator
The LED is lit when the power voltage inside the board is normal.

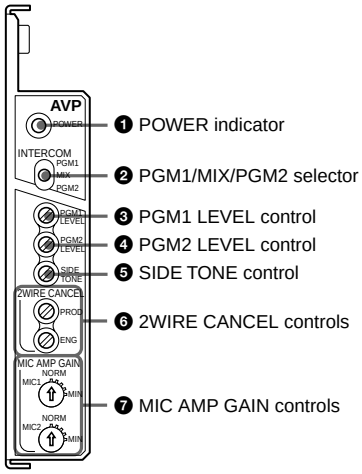
❷ /1.001 (frame frequency) indicator
The LED is lit when the frame frequency of the system is set to 1/1.001.

❸ 90H (phase difference) indicator
The LED is lit when the phase difference between the HD output and SD output is set to 90H (HD).

❹ REFERENCE indicators and switch
The switch is to select the type of sync signal to be connected to either of the REFERENCE connectors on the rear panel.
HD: HD tri-level reference sync signal (local setting)
REM (remote): Signal selected on the MSU-700A/ 750 Master Setup Unit
BB: SD reference sync signal (black burst signal) (local setting)
When a signal is supplied to the REFERENCE connector, the REF IN indicator lights. If the type of the input sync signal does not match the setting on this unit, the UNLOCK indicator will light.

❺ H PHASE switches
Used to adjust the H phase. First set the phase by steps with the STEP switch, then adjust it with the COARSE switch. The COARSE switch will return to its original position when you release it. Press and hold it toward ADV to advance the phase or toward DELAY for phase delay.

7-4-8 *Internal Switches and Internal Boards – AVP Board*



❶ POWER indicator
The LED is lit when the power voltage inside the board is normal.

❷ PGM1/MIX/PGM2 (program audio) selector
To select the program audio to be sent to the headset connected to the intercom connector on the front panel:
PGM1: Program audio 1
MIX: Program audio 1 + Program audio 2
PGM2: Program audio 2

❸ PGM1 LEVEL (program 1 audio level) control
To adjust the mixing volume of the PGM1 audio signal at the headset connected to the intercom connector on the front panel

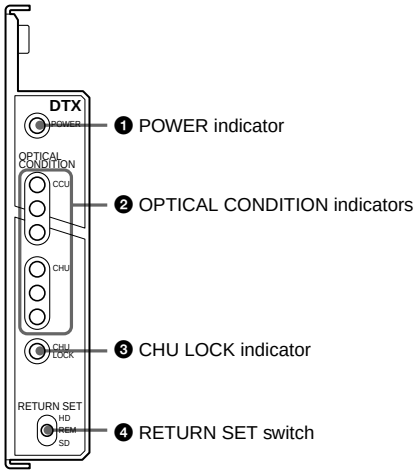
❹ PGM2 LEVEL (program 2 audio level) control
To adjust the mixing volume of the PGM2 audio signal at the headset connected to the intercom connector on the front panel

❺ SIDE TONE control
To adjust the volume of your voice to be supplied to the headset connected to the intercom connector on the front panel

❻ 2WIRE CANCEL controls
When using the 2-wire intercom system, adjust the controls to minimize the side tone level on the producer line (**PROD**) and engineer line (**ENG**).

❼ MIC AMP GAIN (microphone amplifier gain) controls
These controls permit you to adjust the amplifier gain of the camera so that the proper audio levels can be obtained appropriate to the sensitivities of the microphones (MIC1 and MIC2) connected to the camera.
The adjustment is valid when no connection is made to the MIC REMOTE connector on the rear panel of this unit or, if the connection is made, when the internal setting is selected for the connector (pins 8 and 15 are set to a high level). The adjustment range is from NORM (60 dB) to MIN (20 dB) in 10-dB steps. This switch changes the gain of a microphone amplifier in the camera.

7-4-9 *Internal Switches and Internal Boards – DTX Board*



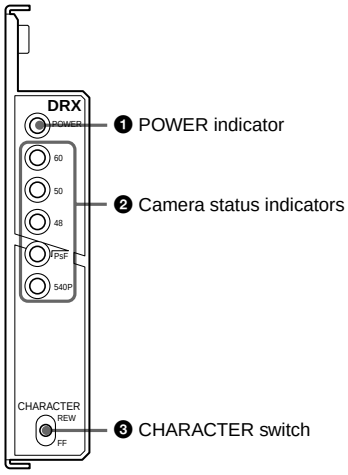
❶ POWER indicator
The LED is lit when the power voltage inside the board is normal.

❷ OPTICAL CONDITION indicators
The corresponding LEDs light to show the condition of optical signal reception at this unit (**CCU**) and the camera (**CHU**):
Green: Good
Yellow: Low optical level
Red: Extremely low optical level, or disconnection
If communication with the connected camera is not established, all the three CHU green, yellow and red indicators go dark.

❸ CHU LOCK indicator
The LED is lit when communication with the connected camera is being properly made.

❹ RETURN SET switch
Select the type of the return video signal to be connected to the RET1, RET2 and RET3 connectors of this unit:
HD: HD-SDI signal (local setting)
REM (remote): Signal selected on the MSU-700A/ 750 Master Setup Unit
SD: SD signal (local setting). Switching between SD SDI and VBS is made with an internal switch.

7-4-10 Internal Switches and Internal Boards – DRX Board

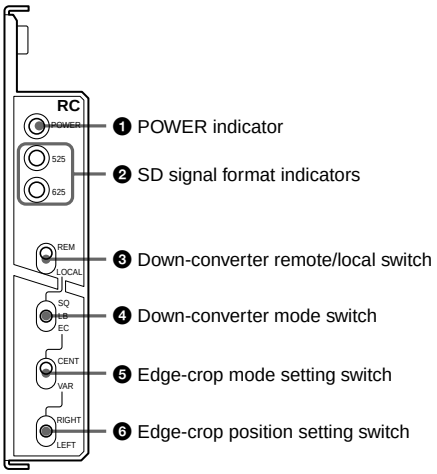


❶ POWER indicator
The LED is lit when the power voltage inside the board is normal.

❷ Camera status indicators
The LEDs will light to show the status of the connected camera:
60/50/48: One of these LEDs that corresponds to the field frequency setting on the camera lights.
PsF: The LED is lit when the camera is operating in Progressive mode.
540P: The LED is lit when the camera is operating in 540-60P mode (not used at present).
Operation mode of the camera is set from the camera control unit.

❸ CHARACTER switch
To page the character displays being imposed to the monitor output. This switch will return to its original position when you release it. Press it toward FF to go to the next page or toward REW to return to the previous page. When you hold the button pressed, the display changes continuously.

7-4-11 Internal Switches and Internal Boards – RC Board



❶ POWER indicator
The LED is lit when the power voltage inside the board is normal.

❷ SD signal format indicators
Either of the indicators lights to show the selected SD signal format:
525: 525-59.94i (NTSC) format
625: 625-50i (PAL) format

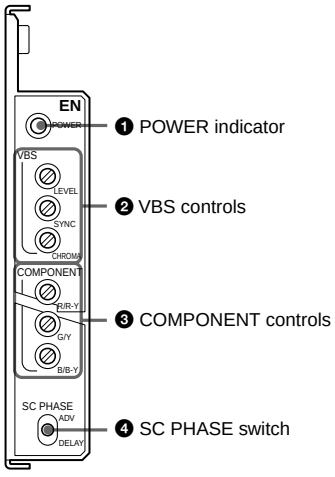
❸ Down-converter remote/local switch
To specify whether the down converter is remotely set or locally set.
REM (remote): To set from the MSU-700A/750 Master Setup Unit
LOCAL: To set on this unit
The switches ❹, ❺, and ❻ become valid with the LOCAL setting.

❹ Down-converter mode switch
To select the operating mode of the down converter:
SQ: Squeeze mode
LB: Letterbox mode
EC: Edge-Crop mode
The switches ❺ and ❻ become valid with the EC setting.

❺ Edge-crop mode setting switch
To set the Edge-crop mode of the down converter:
CENT: To fix the picture frame at the center when performing edge crop
VAR: The edge crop position can be varied with the edge-crop position-setting switch ❻.

❻ Edge-crop position setting switch
To set the edge crop position. This switch will return to its original position when you release it. Press and hold the switch toward RIGHT to move the position to the right (▶) and toward LEFT to move it to the left (◀).

7-4-12 Internal Switches and Internal Boards – EN Board (Internal board of the optional HKCU-951)



❶ POWER indicator
The LED is lit when the power voltage inside the board is normal.

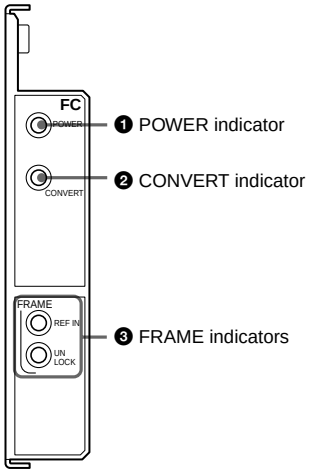
❷ VBS controls
To adjust VBS signal:
LEVEL: To adjust the video level

SYNC: To adjust the sync level
CHROMA: To adjust the chroma level

❸ COMPONENT controls
Each is for adjusting the corresponding component video output (R/R-Y, G/Y, or B/B-Y).

❹ SC PHASE switch
Used to adjust the SC phase with respect to the reference signal (BB).
This switch will return to its original position when you release it. Press and hold the switch toward ADV to advance the phase or toward DELAY for delay.

7-4-13 *Internal Switches and Internal Boards – FC Board (Internal board of the optional HKCU-953)*



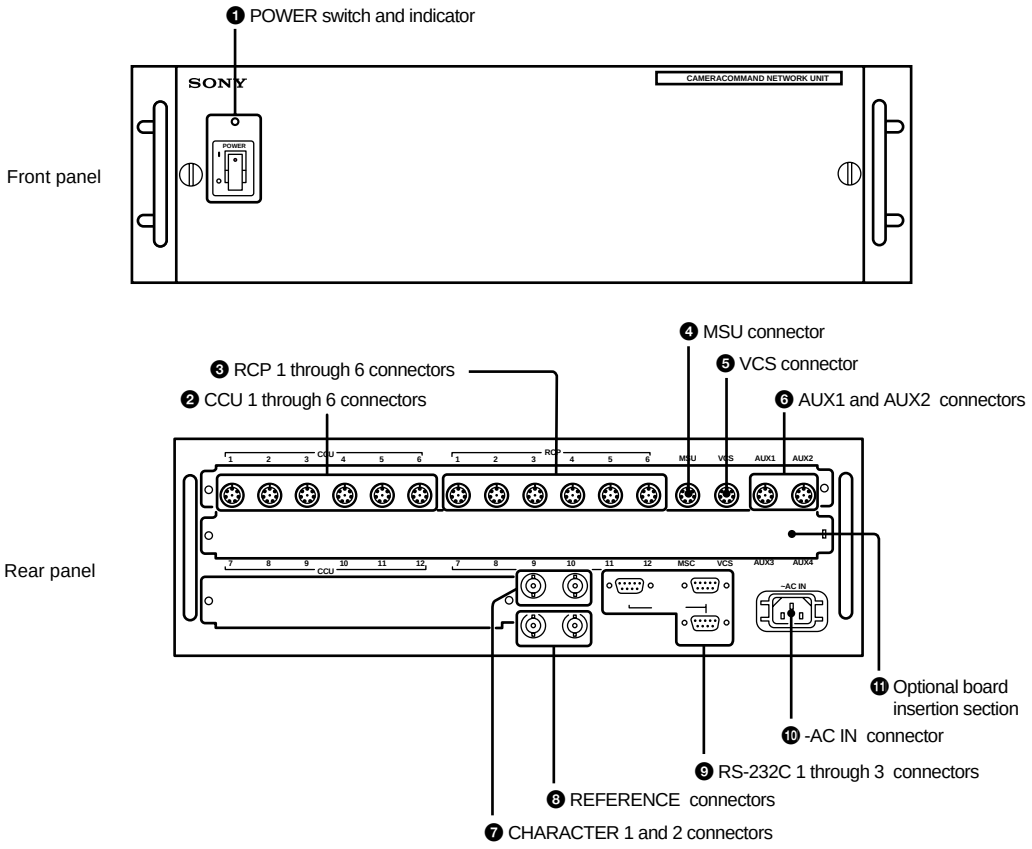
❶ POWER indicator
The LED is lit when the power voltage inside the board is normal.

❷ CONVERT indicator
The LED is lit when the camera is operating in 24PsF mode and the HKCU-953 is supplying 60i/50i signals after frame conversion. It goes dark when the HKCU-953 is supplying the input 24PsF signals as-is or when the camera is operating in 60i, 50i, 30PsF, or 25PsF mode.

❸ FRAME indicators
REF IN: The LED is lit when a subsidiary reference signal for frame lock is being supplied.
UNLOCK: The LED lights if correct lock to the subsidiary reference signal being supplied cannot be achieved.

7-5. CNU-700, Camera Command Network Unit

7-5-1 *Front and Rear Panels*



❶ POWER switch and indicator
Press to turn the power ON or OFF. The indicator illuminates when power is switched on.

❷ CCU (camera control unit) 1 through 6 connectors (8-pin)
Connect to the RCP/CNU REMOTE connector on a CCU-700A/700AP Camera Control Unit using a CCA-5 cable.

❸ RCP (remote control panel) 1 through 6 connectors (8-pin)
Connect to the CCU/CNU REMOTE connectors on an RCP-700 Series Remote Control Panel using a CCA-5 cable.

❹ MSU (Master Set-up Unit) connector (8-pin)
Connect to the CCU/CNU REMOTE connector on an MSU-700 Master Set-up Unit using a CCA-5 cable.

❺ VCS (video selector) connector (8-pin)
Connect to the REMOTE connector of a VCS-700 Video Selector using a CCA-5 cable.

❻ AUX1 and AUX2 (auxiliary 1 and 2) connectors (8-pin)
Connect to the AUX1 or AUX2 connector of another CNU-700 using a CCA-5 cable when controlling multiple cameras with two or more CNU-700 units. You can connect up to eight CNU-700 units.

❼ CHARACTER 1and 2 connectors (BNC type)
Supply character data as a 525 or 625-line, black-and-white video signal. The signal output is automatically selected according to the reference signal input to the REFERENCE connector. If no reference signal is input, the CNU-700 for the USA and Canada supplies a 525-line video signal, the CNU-700 for other countries supplies a 625-line video signal. You can select whether to add a sync signal to the output signal with switch S7 (SYNC ON/OFF) on the AT board. Refer to the system manual for details on the board switch settings.

❽ REFERENCE (reference signal input) loop connectors (BNC type)
Accepts a reference signal (VS, BS, etc.). The signal output from the CHARACTER connector is synchronized with the input signal.

❾ RS-232C 1 through 3 connectors (D-sub 9-pin)
Used for RS-232C interfaces. The function of these connectors depends on whether or not an optional BKP-7930 System Expansion Board is installed in the CNU-700 as shown below.

Connector No	No BKP-7930 installed	With BKP-7930 installed
1	Reserved for ISR system	
2	Reserved for RS-232C interface	
3	Not used	Reserved for RS-232C system

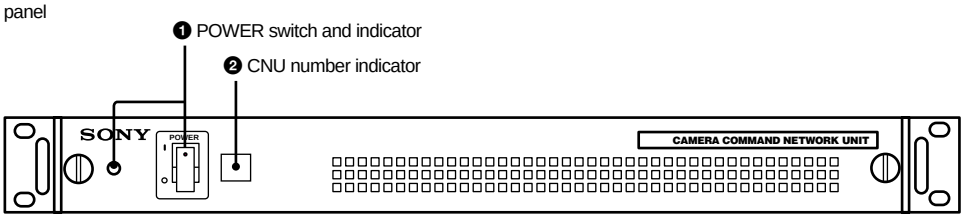
⓾ ~AC IN (AC power input) connector
Connect to an AC power source using the supplied AC power cord. The power cord can be fixed to the CNU-700 using the supplied plug holder.

⓫ Optional board insertion section
Used for attaching the connector panel of an optional BKP-7930/7933. When you attach the BKP-7930 to the CNU-700, up to 12 cameras and remote control panels can be controlled. BKP-7933 enables the S-bus functionality.

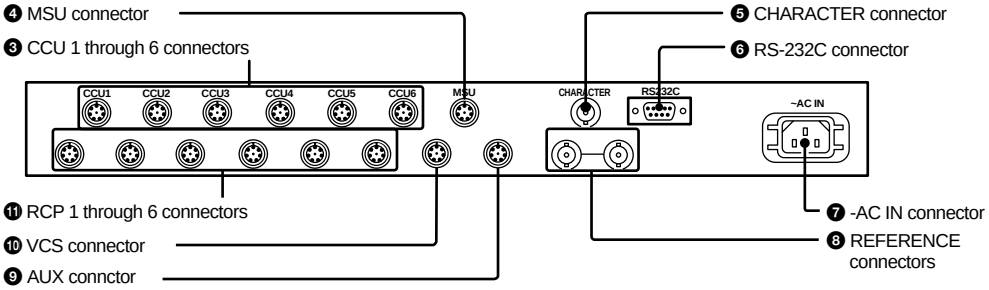
7-6. CNU-500, Camera Command Network Unit

7-6-1 *Front and Rear Panels*

Front panel



Rear panel



❶ POWER switch and indicator
Press to turn the power ON or OFF. The indicator illuminates when power is switched on.

❷ CNU number indicator
Attach the number plate.

❸ CCU (camera control unit) 1 through 6 connectors (8-pin)
Connect to the RCP/CNU/ REMOTE connector of a CCU-700A/700AP Camera Control Unit using a CCA-5 cable.

❹ MSU (Master Set-up Unit) connector (8-pin)
Connect to the CCU/CNU REMOTE connector on an MSU-700 Master Set-up Unit using a CCA-5 cable.

❺ CHARACTER connector (BNC type)
Supplies character data as a 525 or 625-line, black-and-white video signal. The signal output is automatically selected according to the reference signal input to the REFERENCE connector. If no signal is input to the REFERENCE connector, the CNU-500 for the USA and Canada supplies a 525-line video signal, and the CNU-500 for other countries supplies a 625-line video signal.

❻ RS-232C connector (D-sub 9-pin)
Used for the RS-232C interface. This connector is reserved for the ISR system.

❼ ~AC IN (AC power input) connector
Connect to an AC power source using the supplied AC power cord. The power cord can be fixed to the CNU-500 using the supplied plug holder.

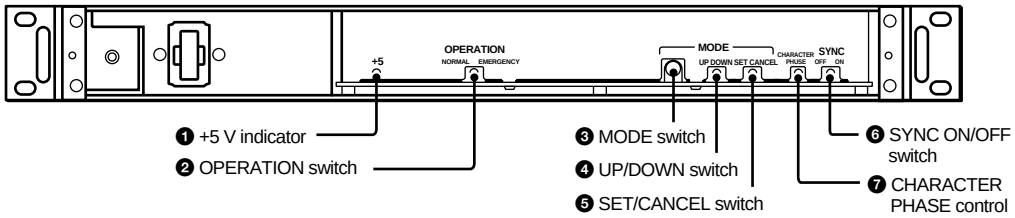
❽ REFERENCE (reference signal input) connector (BNC type)
Accept a reference signal (VS, BS, etc.). The signal output from the CHARACTER connector is synchronized with the input signal.

❾ AUX (auxiliary) connector (8-pin)
Not used.

❿ VCS (video selector) connector (8-pin)
Connect to the REMOTE connector of a VCS-700 Video Selector using a CCA-5 cable.

⓫ RCP (remote control panel) 1through 6 connectors (8-pin)
Connect to the CNU/CCU REMOTE connector on RCP-700 Series Remote Control Panels using a CCA-5 cable.

7-6-2 *Internal Board*



❶ +5 V indicator
Lights when +5 V power to the board.

❷ OPERATION switch
NORMAL: Set to this position for normal operation.
EMERGENCY: Set to this position when the CNU-500 or MSU-700 cannot function normally. The RCP-700 Series Remote Control Panels are directly connected to their respective camera control units.
The switch is set to NORMAL at the factory.

❸ MODE switch
0: Factory setting
1: When the switch is set to this position, the UP/DOWN switch is activated, and the switch changes the character page displayed on a monitor connected to the CHARACTER connector.
2 through F: Not used.

❹ UP/DOWN switch
Changes the page displayed on the monitor screen. This switch functions only when the MODE switch is set to 1. The contents of each page are shown in the following table.

Page	Contents
1	Nothing appears when power is turned on. Shows a warning if a problem is detected by the self-diagnosis of the camera.
2	Connection status of Cameras 1 through 6.
3	Not used.
4	Not used.
5	Shows the results of auto set-up of Camera 1 through 6.
6	Cannot be used.
7	DIAGNOSIS OF ALL CAMERAS displays, which shows the results of the self-diagnosis of all the cameras.
8	Not used.
9	DIAGNOSIS OF ONE CAMERA display, which shows the results of the self-diagnosis of the selected camera.
10	DATA OF ALL CAMERAS display, which shows the setting status of each camera.
11	DATA OF ONE CAMERA display, which shows the setting status of the selected camera.

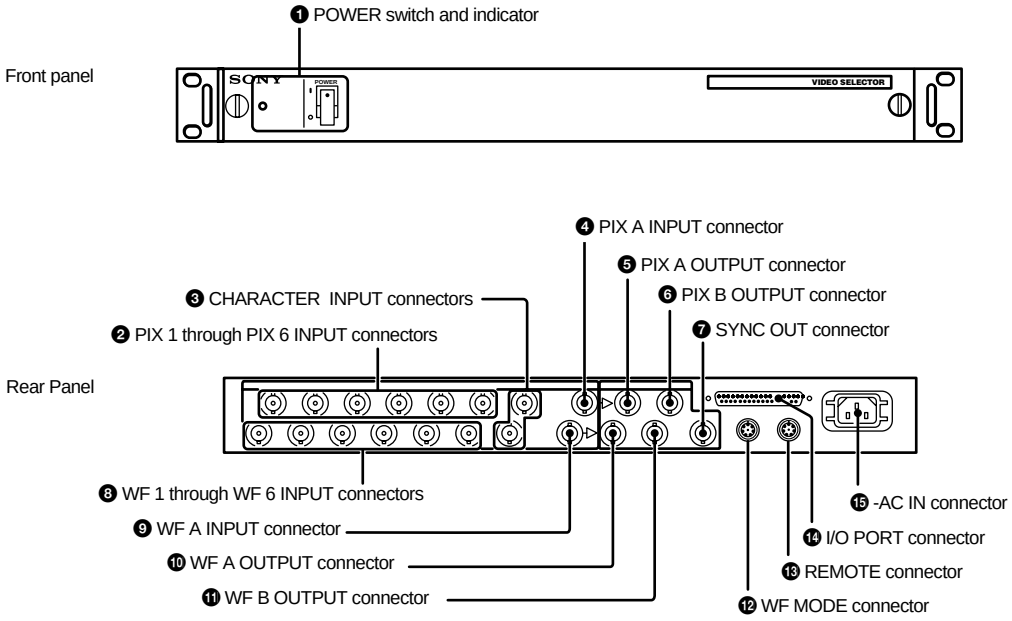
❺ SET/CANCEL switch
Selects the displayed item or camera (CAM) when display page 9, 10 or 11 appears on the monitor screen.

❻ SYNC ON/OFF switch
Selects whether the sync signal is to be added to the video signal output from the CHARACTER connector. At the factory, the switch is set to ON (added).

❼ CHARACTER PHASE control
Adjusts the horizontal phase of the signal output from the CHARACTER connector, referring to the reference signal. Adjust the phase by monitoring the signal on the monitor screen.

7-7. VCS-700, Video Selector

7-7-1 *Front and Rear Panels*



❶ POWER switch and indicator
This switch turns the power ON and OFF. The indicator illuminates when power is switched on.

❷ PIX1 through PIX6 INPUT (picture monitor 1 through 6 inputs) connectors (BNC type)
Accept video signals for a picture monitor. Connect each of these connectors to the PIX2 OUTPUT connector on the CCU-700A/700AP Camera Control Unit. The signal loss of a connecting cable up to about 30 meters (99 feet) long can be compensated for with the switch on the internal board. For details, refer to the system manual.

❸ CHARACTER INPUT connectors (BNC type)
Accept character signals. The input signal is mixed with the signal output from the PIX OUTPUT connector. Connect to the CHARACTER connector on the CNU-700 Camera Command Network Unit. When using two VCS-700 units, connect either of these connectors to the CHARACTER INPUT connector on a second VCS-700. When a bridge connection is not made, be sure to terminate with 75 ohms.

❹ PIX A INPUT (picture monitor A input) connector (BNC type)
Connect to the PIX A OUTPUT connector on a second VCS-700 when using two or more VCS-700 selectors.

❺ PIX A OUTPUT (picture monitor A output) connector (BNC type)
Supplies a video signal for a picture monitor. Select the output signal with the camera select buttons on an MSU-700 or by command from the I/O PORT connector on the VCS-700 Video Selector. When using two or more VCS-700 units, connect this connector to the PIX A INPUT connector on each subsequent VCS-700, and a picture monitor to the PIX A OUTPUT connector on the final VCS-700 in the series connection.

❻ PIX B OUTPUT (picture monitor B output) connector (BNC type)
Supplies the same video signal for a picture monitor as the PIX A OUTPUT connector. The signal loss of a connecting cable up to about 100 meters (330 feet) long can be compensated for with the switch on the internal board. When you connect a picture monitor using a long connecting cable, connect it to this connector. When using two or more VCS-700 units connected in series, connect a picture monitor to the PIX B OUTPUT loop connector on the VCS-700 whose PIX A OUTPUT connector is not used for series connection. For details on cable compensation, refer to the system manual.

❼ SYNC OUT (sync signal output) connector (BNC type)
Supplies the sync signal for a picture monitor.

❽ WF1 through WF6 INPUT (waveform monitor 1 through 6 input) connectors (BNC type)
Accept video signals for a waveform monitor. Connect these connectors as required to the WF2 OUTPUT connector on CCU-700A/700AP Camera Control Units. The signal loss of a connecting cable up to about 30 meters (99 feet) long can be compensated for with the switch on the internal board. For details, refer to the system manual.

❾ WF A INPUT (waveform monitor A input) connector (BNC type)
Connect to the WF A OUTPUT connector on a second VCS-700 when using two of these units.

❿ WF A OUTPUT (waveform monitor A output) connector (BNC type)
Supplies the video signal for a waveform monitor. Select the output signal with the camera select buttons on an MSU-700 or by command from the I/O PORT connector on a VCS-700. When using two or more VCS-700 units, connect this connector to the WF A INPUT connector on each subsequent VCS-700, and a

waveform monitor to the WF A OUTPUT loop connector on the VCS-700 which is the last unit in the series connection.

⓫ WF B OUTPUT (waveform monitor B output) connector (BNC type)
Supplies the same video signal for a waveform monitor as the WF A OUTPUT connector. The signal loss of a connecting cable up to 100 meters (330 feet) long can be compensated for with the switch on the internal board. When you connect a waveform monitor using a long connecting cable, connect it to this connector. When using two or more VCS-700 units connected in series, connect a waveform monitor to the PIX B OUTPUT connector on the VCS-700 whose WF A OUTPUT loop connector is not used for series connection. For details on cable compensation, refer to the system manual.

⓬ WF MODE (waveform monitor mode) connector (4-pin)
Connect to a corresponding connector on a waveform monitor to view the signals in sequential mode. This connector supplies a staircase signal and sequential ON/OFF control signal.

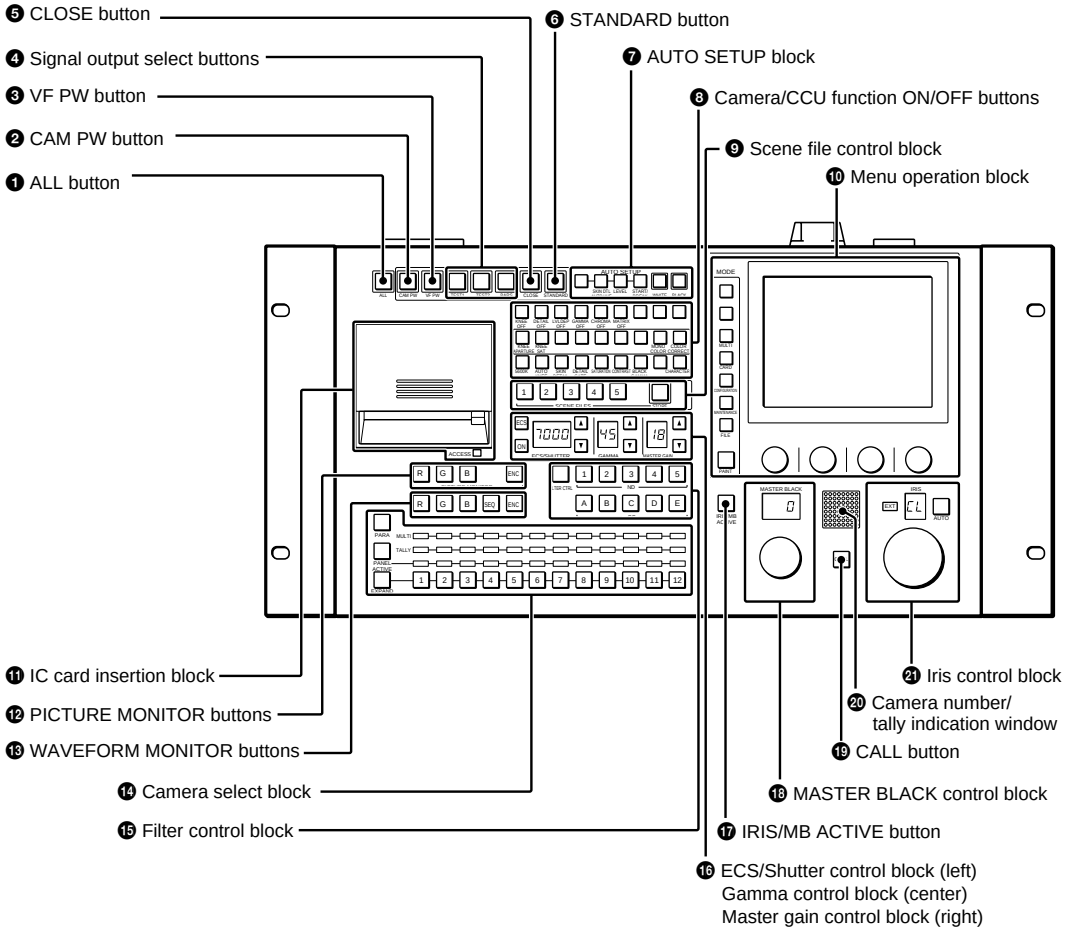
⓭ REMOTE connector (8-pin)
Connect a CNU-700 Camera Command Network Unit using a CCA-5 cable.

⓮ I/O PORT (remote control) connector (D-sub 37-pin)
Accepts and supplies external control signals. You can select the signals output to a picture monitor and a waveform monitor with an external video selector connected to this connector. The selected input connector number is supplied from this connector.

⓯ ~AC IN (AC power input) connector
Connect to an AC power source using the supplied AC power cord. The power cord can be fixed to the VCS-700 using the supplied plug holder.

7-8. MSU-700A, Master Setup Unit

7-8-1 *Operation Panel*



❶ ALL button
Press the button so it starts flashing to activate the 13 buttons located at the right (from CAM PW to AUTO SETUP) for all the connected cameras of the same group.

❷ CAM PW (camera power) button
Press and light up this button to turn the power supply to the video camera ON. (The button promptly flashes until the camera becomes ready for transmission.)

When you press this button again, it starts flashing and the power supply to the camera is turned off.

❸ VF PW (viewfinder power) button

Press and light up this button to turn the power supply to the viewfinder ON. When you press the button again, it goes dark and the power supply is turned off.

❹ Signal output select buttons

Press and light up one of these buttons to activate the test signal generator of the video camera and send the respective signals.

TEST 1: To send a gamma signal to test the video circuits

TEST 2: To send a staircase signal

BARS: To send a color bar signal

Note

The BARS button takes priority to the other two buttons. If the BARS button is lit, press the button to turn it dark before pressing the TEST 1 or TEST 2 button.

❺ CLOSE (iris close) button

Press and light the button to close the iris. Press again to release the close mode.

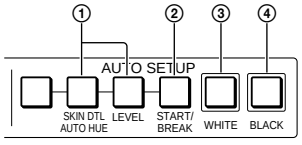
❻ STANDARD button

When you press this button, the video camera is initialized to its standard state and the button lights for several seconds. If you press the button while it lights, the video camera returns to the state before the button was lit.

For details, refer to the System Manual.

❼ AUTO SETUP block

For automatic adjustments of cameras.



① Auto adjustment item select buttons
Press and light up these buttons to select the items to be automatically adjusted.
SKIN DTL AUTO HUE: Skin tone detail automatic hue
LEVEL: Gamma balance, knee point, master black level, etc.

② START/BREAK button
Press to start automatic adjustment of the selected items. The button lights during adjustment and goes dark when adjustment is completed. If you press the button when lit, the automatic adjustment is canceled and the button flashes. To stop the flashing, press the button again.

③ WHITE (white balance) button
Press to automatically adjust the white balance. The button lights during adjustment and goes dark when adjustment is completed. If you press this button when lit or the START/ BREAK button, the automatic adjustment is canceled and the button flashes. To stop the flashing, press the button again.

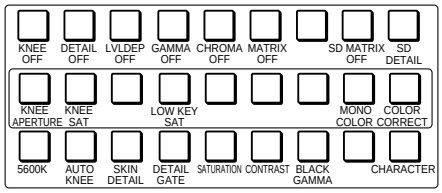
④ BLACK (black balance) button
Press to automatically adjust the black balance and black set. The button lights during adjustment and goes dark when adjustment is completed. If you press this button when lit or the START/ BREAK button, the automatic adjustment is canceled and the button flashes. To stop the flashing, press the button again.

Notes

- If an error occurs during adjustment, the pressed button flashes.
- The leftmost button is for future use and has no function at present.

❽ Camera/CCU function ON/OFF buttons

Various functions of the video camera or the CCU can be turned on and off from this unit. The following switching functions are assigned to 18 of the buttons at the factory and the other nine buttons are reserved for future use.



Upper row (OFF when the button is lit)

KNEE OFF: Knee compensation function
DETAIL OFF: Detail compensation function
LVL DEP OFF: Level dependent function which controls the details in the dark part of a picture
GAMMA OFF: Gamma function
CHROMA OFF: Chroma function
MATRIX OFF: Linear matrix function to enhance color fidelity

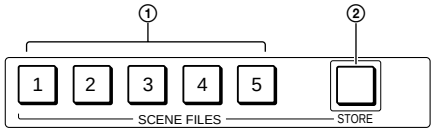
Middle row (ON when the button is lit)

KNEE APERTURE: Knee aperture function
KNEE SAT: Knee saturation function
MONO COLOR: Mono color function which mixes the chroma signals of a single hue to the luminance signal. The chroma level is modulated according to the luminance signal.
COLOR CORRECT: Color correction function for a certain hue range.

Lower row (ON when the button is lit)

5600K: 5600K electronic color temperature conversion function
AUTO KNEE: Auto knee function. When this button is lit (ON), the knee point is automatically adjusted according to the light content of the picture.
SKIN DETAIL: Skin tone detail function
DETAIL GATE: Skin tone detail gate function. When this button is lit (ON), the adjustment range of the skin tone detail is displayed in white on the monitor screen.
SATURATION: Saturation function
CONTRAST: Contrast function
BLACK GAMMA: Black gamma function
CHARACTER: System information display function. When this button is lit (ON), the various information on the entire system is displayed on the monitor connected to the CHARACTER connector of the CNU-700. The display contents can be changed through a menu operation.

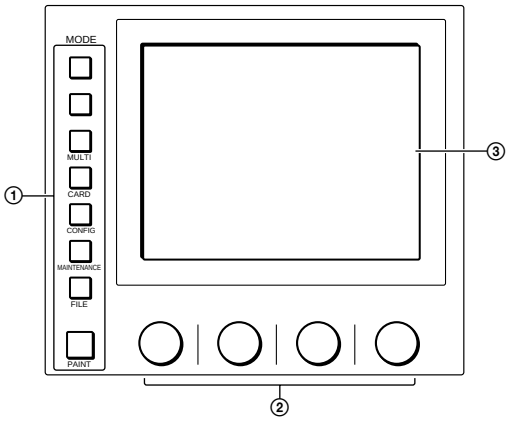
❾ Scene file control block



① SCENE FILES buttons
While the STORE button is flashing: When you press one of these buttons, the current setting data is stored as a file of the corresponding number.
When the STORE button is dark: The stored data can be retrieved by pressing and lighting up the button of the desired number. Press the lit button to turn it dark and resume the previous status.

② STORE button
To store a scene file, first press this button so that the button starts flashing, then press the SCENE FILES button of the desired number. When file registration is completed, the STORE button goes dark. To cancel the registration, press the flashing button again before pressing the SCENE FILES button. The STORE button goes dark.

❿ Menu operation block

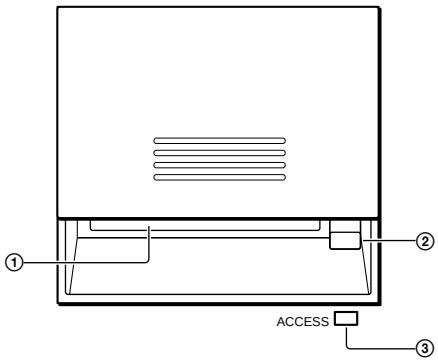


① MODE (mode select) buttons
Select the menu mode. If you press and light one of these buttons, the menu for the selected mode appears on the EL display. When the lit button is pressed again, it goes dark and the menu on the display also disappears.
MULTI: Selects Multi-Control menu to set the requirements for Master/Slave mode to set up multiple cameras in synchronization.
CARD: Selects IC memory card menu to initialize IC cards.
CONFIG: Selects Configuration menu to configure this unit and the entire camera system.
MAINTENANCE: Maintenance mode to set various camera maintenance items and the H and SC phases of CCU, etc.
FILE: Selects File operation menu to retrieve and transfer reference files, lens files and scene files in the video camera or on IC cards.
PAINT: Selects Paint control menu to adjust various paint items, such as white, black and flare.

② Control knobs (rotary encoders)
Adjust the selected items on the touch panel.

③ EL display/touch panel
Displays the menu selected with the MODE buttons and permits the displayed items to be adjusted.

⓫ IC card insertion block



① IC card slot
Insert an IC card (which conforms to PCMCIA) to store reference files and scene files of the video camera or CCU (SRAM CARD ONLY).

To insert a card

[1] Slide the cover to open the IC card insertion block.
[2] Insert the card into the slot. When the card is correctly set, the ACCESS indicator lights in green.

Note

The data in the memory card is maintained by the battery built into the card. If the battery is exhausted, the data in the card will be lost. You can check the battery condition by the ACCESS indicator. If the battery becomes weak, replace the battery with a new one as soon as possible.

② Eject button
Press to eject the inserted IC card.

Note

Do not eject a card when the ACCESS indicator is lit in red (it means that the data is being read from or written to the card). This may erase data stored in the card.

③ ACCESS indicator
Shows the status of the IC memory card.

Indication	Meaning or Measures
Off	No card is inserted.
Lit in green	There is a card in the slot. (The battery condition is good.)
Lit in orange	The battery of the card in the slot begins losing its charge. Although the data are still maintained, replace the battery at the earliest opportunity..
Flashes in orange	The battery of the card in the slot is almost exhausted. While the card stays in the MSU-700A, the MSU-700A supplies the power to the card. However when the card is ejected, the data cannot be maintained. Replace the battery before using.
Lit in red	Data are being read/written. If you eject the disc in this condition, the data is not guaranteed. All the data may be lost

For battery replacement, refer to the instructions for the IC card.

⓬ PICTURE MONITOR buttons

Press to select the output signal from the PIX2 OUTPUT connector of CCU.

The signal corresponding to the lit button is output.

R/G/B: Select the R signal, G signal, or B signal. The signals can be selected either independently or in combination. When any of these buttons is pressed, the ENC circuit is turned off.

ENC (encode): When this button is pressed, the R/G/B circuits are turned off, and the ENC signal is output.

⓭ WAVEFORM MONITOR buttons

Press to select the output signal from the WF2 OUTPUT connector of CCU.

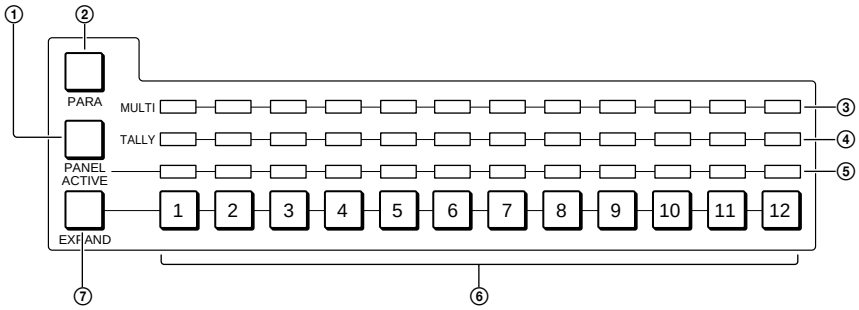
The signal corresponding to the lit button is output.

R/G/B: Select the R signal, G signal, or B signal. The signals can be selected either independently or in combination. When any of these buttons is pressed, the SEQ and ENC circuits are turned off.

SEQ (sequence): When this button is pressed, the R/G/B circuits are turned off, and the SEQ signal is output. You can monitor the waveforms of the three R, G, and B signals in sequence on a waveform monitor.

ENC (encode): When this button is pressed, the R/G/B and SEQ circuits are turned off, and the ENC signal is output.

⓮ Camera select block



① PANEL ACTIVE button
Press and light up this button to permit the cameras selected with the camera select buttons to be controlled from this unit. The IRIS/MB ACTIVE button also lights up. If you press the button when lit, it goes dark and the operation panel of this unit is locked.

② PARA (parallel mode) button
Press and light up this button to activate Parallel mode, which enables concurrent operation with another control panel. If you press the button when lit, it goes dark and Parallel mode is canceled.

③ MULTI indicators
Show the Master/Slave status of the corresponding cameras 1 through 12 (when the EXPAND button is not lit) or 13 through 24 (when the EXPAND button is lit).
The indicator for the camera which is specified as the master for Master/Slave mode lights in green. The indicators for the slave cameras light in orange. They light in red during the auto setup of the corresponding cameras. If an error occurs during the auto setup and the operation is interrupted, they will flash in red.

④ TALLY indicators
Show the tally status of the corresponding cameras 1 through 12 (when the EXPAND button is not lit) or 13 through 24 (when the EXPAND button is lit). The corresponding indicator lights in red when a red tally is sent to a camera, and it lights in green when a green tally is sent. When both red and green tally are sent, it lights in orange. When a call signal is sent to the camera, the indicator rapidly flashes in red.

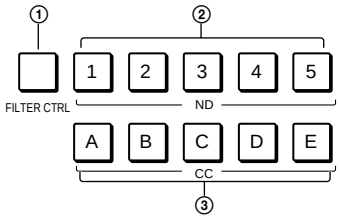
⑤ Active indicators
Show the control status of the corresponding cameras 1 through 12 (when the EXPAND button is not lit) or 13 through 24 (when the EXPAND button is lit). The indicators for the cameras under control of this unit light in green and the indicators for the cameras under control of another control panel light in orange. An indicator whose corresponding camera (or camera control unit) is not connected does not light. An indicator lights in red when an error is detected and the self-diagnostic functions are activated in the corresponding camera or camera control unit.

⑥ Camera select buttons
Select the cameras to be controlled from this unit. Press and light up the button corresponding to each desired camera. Cameras 1 through 12 are selected when the EXPAND button is not lit, and cameras 13 through 24 are selected when the EXPAND button is lit.

⑦ EXPAND button
Press to select the group to be selected with the camera select buttons. Cameras 1 through 12 can be selected when this button is not lit, and cameras 13 through 24 can be selected when this button is lit.

Note
An appropriate camera command network unit (CNU- 700, etc.) is required to control multiple cameras using the camera select function.

⓯ Filter control block



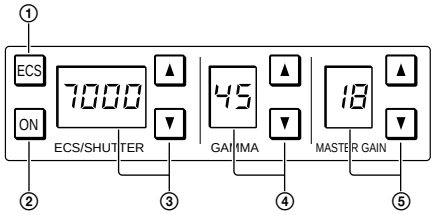
① FILTER CTRL (filter control) button
Press and light up the button to enable filter selection with the CC and ND filter select buttons of this unit.

② ND (ND filter select) buttons
While the FILTER CTRL button is lit, press and light up one of these buttons to select the corresponding ND filter.

Examples
1: Clear
2: 1/4 ND
3: 1/8 ND
4: 1/16 ND
5: 1/64 ND
When the FILTER CTRL button is not lit, the button corresponding to the filter selected at the video camera lights.

③ CC (color temperature conversion filter select) buttons
While the FILTER CTRL button is lit, press and light up one of these buttons to select the corresponding CC filter.
Examples
A: Cross filter
B: 3200K (clear)
C: 4300K
D: 6300K
E: 8000K
When the FILTER CTRL button is not lit, the button corresponding to the filter selected at the video camera lights.

⑯ ECS/Shutter control block (left) Gamma control block (center) Master gain control block (right)



① ECS (Extended Clear Scan) button
Press and light up the button to set the video camera to ECS mode. Press again and turn off the button to set the video camera to Shutter mode.

② ON button
Turns on and off the ECS function (when the ECS button is lit) or the shutter function (when the ECS button is not lit). The function is ON when this button is lit.

③ ECS frequency/Shutter speed select buttons and display window
In ECS mode (when the ECS button is lit):
The selected ECS frequency is displayed in the window. Press to select the desired scan frequency.
The frequency increases when the ▲ (up) button is pressed and decreases when the ▼ (down) button is pressed. It continuously changes when either button is kept pressed.
In Shutter mode (when the ECS button is not lit):
The denominator of the selected step shutter speed is displayed in the window. Press to select the desired shutter speed. The speed increases when the ▲ (up) button is pressed and decreases when the ▼ (down) button is pressed. It continuously changes when either button is kept pressed.

④ GAMMA select buttons and display window
Select the step gamma. The selected value is displayed in the window. The gamma value decreases when the ▲ (up) button is pressed and increases when the ▼ (down) button is pressed. It continuously changes when either button is kept pressed.
Note
The higher the gamma effect, the lower the value.

⑤ MASTER GAIN selects buttons and display window
Select the appropriate video gain according to the illumination of the subject to be shot. The selected value (dB) is displayed in the window. The gain value increases when the ▲ (up) button is pressed and decreases when the ▼ (down) button is pressed. It continuously changes when either button is kept pressed.

⑰ IRIS/MB ACTIVE (iris/master black active) button

Press and light up this button to enable the iris and master black adjustment functions of the unit.
When the PANEL ACTIVE button is pressed, this button automatically lights. To disable only the iris/master black control block of the panel, press this button so that it goes dark.

⑱ MASTER BLACK control block

Turn the control to adjust the master black level. The adjustment value is displayed in the display window.

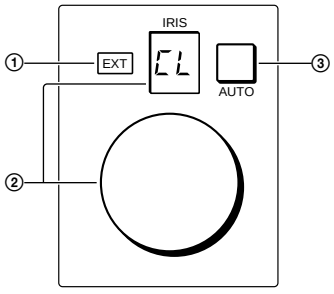
⑲ CALL button

Press to send a call signal to the video camera, on which the CALL button lights. The tally lamps on the camera and the red tally lamp on the CCU light when not lit, or go dark when lit.
When the CALL button on the video camera is pressed, the CALL button on this unit lights and a buzzer sounds.

⑳ Camera number/tally indication window

The number of the camera being controlled from this unit is displayed in orange.
When a red tally signal is sent to the camera, the number is displayed in black and the background of the number lights in red.
When a green tally signal is sent to the camera, the number is displayed in black and the background of the number lights in green.
When both the red and green tally signals are simultaneously sent, the left half of the background lights in red and the right half lights in green.

㉑ Iris control block



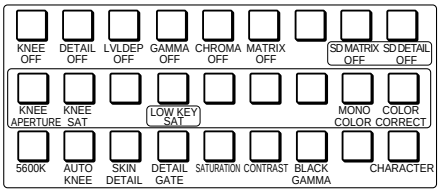
① EXT (lens extender) indicator
Lights when the lens extender is used.

② IRIS control and display window
When the AUTO button is not lit, you can adjust the iris manually by turning the control. The adjustment value is displayed in f numbers on the display.
When the AUTO button is lit, the reference value for automatic iris adjustment can be set in a range of ±2f with this control.
When the iris is closed, “CL” is displayed in the window.

③ AUTO button
Press and light the button to automatically adjust the iris according to the amount of input light (Auto Iris). If you press the button when lit, it goes dark and manual iris adjustment is enabled.
Note
If the subject being used as the reference for automatic adjustment is lost while operating a camera having the skin tone auto iris function, the skin tone auto iris stops functioning, and the iris value at that time is maintained. The AUTO button then flashes. In this condition, not only is the iris not automatically adjusted but also it cannot be changed manually. When you wish to change the iris, turn Auto Iris off. If Auto Iris is kept ON, the skin tone auto iris will start functioning when the subject for reference is resumed.

7-8-2 *Operation Panel in use with HD Equipment*

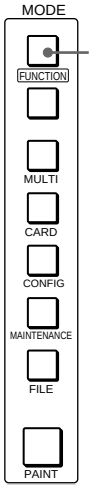
Camera/CCU function ON/OFF buttons
When this unit is used in an HD camera system (HDC-700/750/700A/750A/900/950/930, HDW-700/F900, HDCU-700/900/950), another three camera/CCU function ON/OFF buttons become effective. Use the unit with the labels for an HD system (supplied) attached to the appropriate positions.



Right two buttons in the upper row (OFF when the button is lit)
SD MATRIX OFF: To turn on/off the linear matrix in down converting
SD DETAIL OFF: To turn on/off the SD contour compensation function in down converting

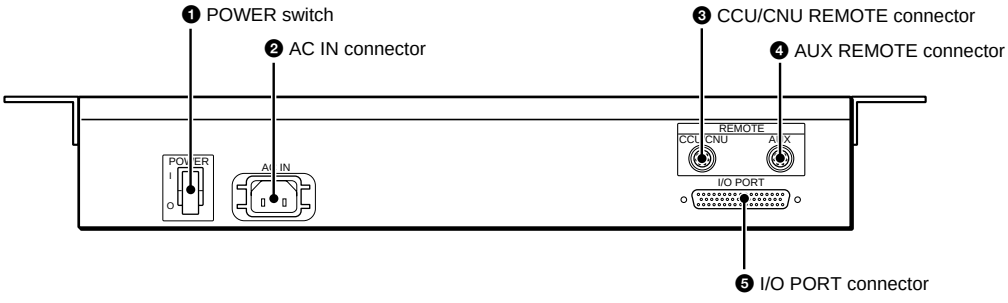
Fourth button from the left in the middle row (ON when the button is lit)
LOW KEY SAT: To turn on/off the low key saturation function (linear matrix for dark areas)

Menu operation block/1 MODE (mode select) buttons
The uppermost MODE button in the menu operation block functions as the FUNCTION button both in HD and SD camera systems. Use the unit with the supplied label attached as shown below.



FUNCTION buttons:
Selects Function menu to control various camera and CCU functions.

7-8-3 *Connector Panel*



❶ POWER switch
Turns on and off the power of this unit.

❷ AC IN (AC power input) connector
Connect to an AC power source using an optional AC power cord. The power cord can be fixed to this unit using an optional plug retainer.

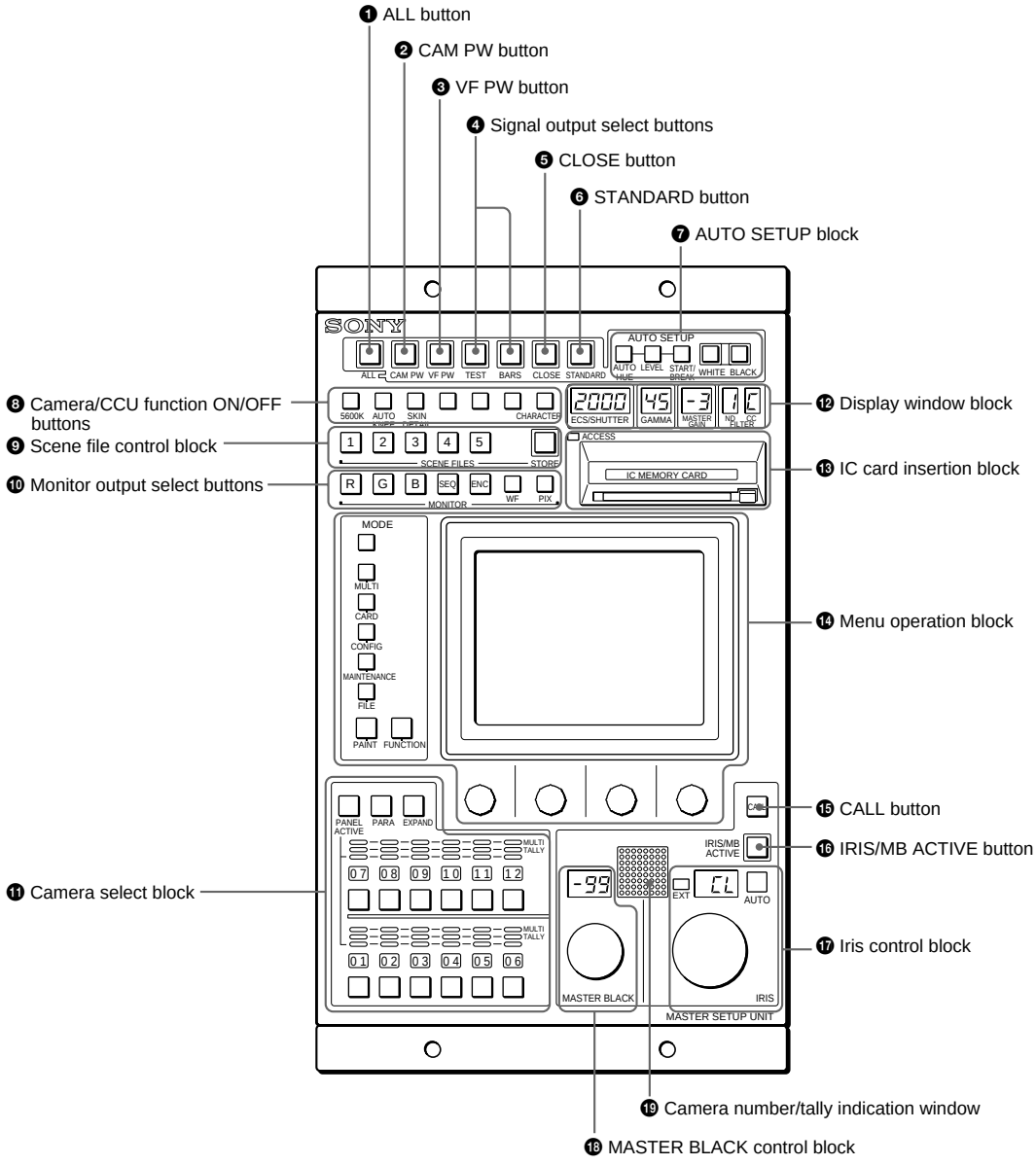
❸ CCU/CNU REMOTE (camera control unit/ camera command network unit remote) connector (8-pin)
Connect to the RCP/CNU connector of CCU or the MSU connector of CNU.

❹ AUX REMOTE (auxiliary remote) connector (8-pin)

❺ I/O PORT connector (50-pin)

7-9. MSU-750, Master Setup Unit

7-9-1 *Operation Panel*



❶ ALL button
Press the button so it starts flashing to activate the 11 buttons located at the right (from CAM PW to AUTO SETUP) for all the connected cameras of the same group.

❷ CAM PW (camera power) button
Press and light up this button to turn the power supply to the video camera ON. (The button promptly flashes until the camera becomes ready for transmission.) When you press this button again, it starts flashing and the power supply to the camera is turned off.

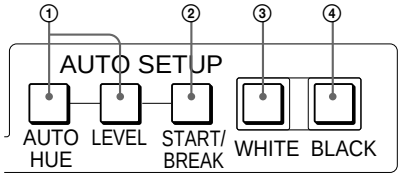
❸ VF PW (viewfinder power) button
Press and light up this button to turn the power supply to the viewfinder ON. When you press the button again, it goes dark and the power supply is turned off.

❹ Signal output select buttons
Press and light up one of these buttons to activate the test signal generator of the video camera and send the respective signals.
TEST: To send a signal to test the video circuits
BARS: To send a color bar signal
Note
The BARS button takes priority to the TEST button. If the BARS button is lit, press the button to turn it dark before pressing the TEST button.

❺ CLOSE (iris close) button
Press and light the button to close the iris. Press again to release the close mode.

❻ STANDARD button
When you press this button, the video camera is initialized to its standard state and the button lights for several seconds. If you press the button while it lights, the video camera returns to the state before the button was lit.

❼ AUTO SETUP block
For automatic adjustments of cameras.



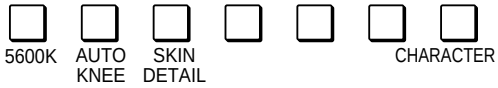
① Auto adjustment item select buttons
Press and light up these buttons to select the items to be automatically adjusted.
AUTO HUE: Skin tone detail automatic hue
LEVEL: Gamma balance, knee point, master black level, etc.

② START/BREAK button
Press to start automatic adjustment of the selected items. The button lights during adjustment and goes dark when adjustment is completed. If you press the button when lit, the automatic adjustment is canceled and the button flashes. To stop the flashing, press the button again.

③ WHITE (white balance) button
Press to automatically adjust the white balance. The button lights during adjustment and goes dark when adjustment is completed. If you press this button when lit or the START/ BREAK button, the automatic adjustment is canceled and the button flashes. To stop the flashing, press the button again.

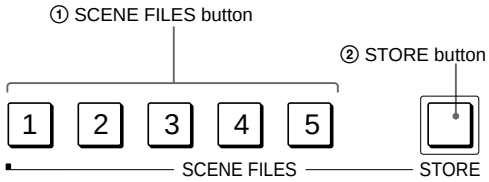
④ BLACK (black balance) button
Press to automatically adjust the black balance and black set. The button lights during adjustment and goes dark when adjustment is completed. If you press this button when lit or the START/ BREAK button, the automatic adjustment is canceled and the button flashes. To stop the flashing, press the button again.
Note
If an error occurs during adjustment, the pressed button flashes.

❽ Camera/CCU function ON/OFF buttons
Various functions of the video camera or the CCU can be turned on and off from this unit (ON when the button is lit).
The following switching functions are assigned to four of the buttons at the factory and the other three buttons are reserved for future use.



5600K: 5600K -electronic color temperature conversion function
AUTO KNEE: Auto knee function. When this button is lit (ON), the knee point is automatically adjusted according to the light content of the picture.
SKIN DETAIL: Skin tone detail function
CHARACTER: System information display function. The various information on the entire system is displayed on the monitor connected to the CHARACTER connector of the CNU-700. The display contents can be changed through a menu operation.

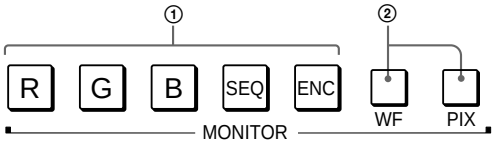
❾ Scene file control block



① SCENE FILES buttons
While the STORE button is flashing: When you press one of these buttons, the current setting data is stored as a file of the corresponding number.
When the STORE button is dark: The stored data can be retrieved by pressing and lighting up the button of the desired number. Press the lit button to turn it dark and resume the previous status.

② STORE button
To store a scene file, first press this button so that the button starts flashing, then press the SCENE FILES button of the desired number. When file registration is completed, the STORE button goes dark. To cancel the registration, press the flashing button again before pressing the SCENE FILES button. The STORE button goes dark.

❿ Monitor output select buttons
Press to select the output signal from the WF2 and PIX2 OUTPUT connectors of CCU.



① Output signal select buttons
After selecting the output connector of the CCU by pressing either the WF or PIX button, press to light the button for the signal to be output. The signal corresponding to the lit button is output.
R/G/B: Select the R signal, G signal, or B signal. The signals can be selected either independently or in combination. When any of these buttons is pressed, the SEQ (for WF only) and ENC circuits are turned off.
SEQ (sequence): Effective only for the WF2 OUTPUT connector. When this button is pressed, the R/G/B circuits are turned off, and the SEQ signal is output. You can monitor the waveforms of the three R, G, and B signals in sequence on a waveform monitor.
ENC (encode): When this button is pressed, the R/G/B and SEQ circuits are turned off, and the ENC signal is output.

② Output connector select buttons
WF: Press to light the button when switching the output signal from the WF2 OUTPUT connector with the output signal select buttons. Press the button again to make it go dark.
PIX: Press and light the button when switching the output signal from the PIX2 OUTPUT connector with the output signal select buttons. Press the button again to make it go dark.

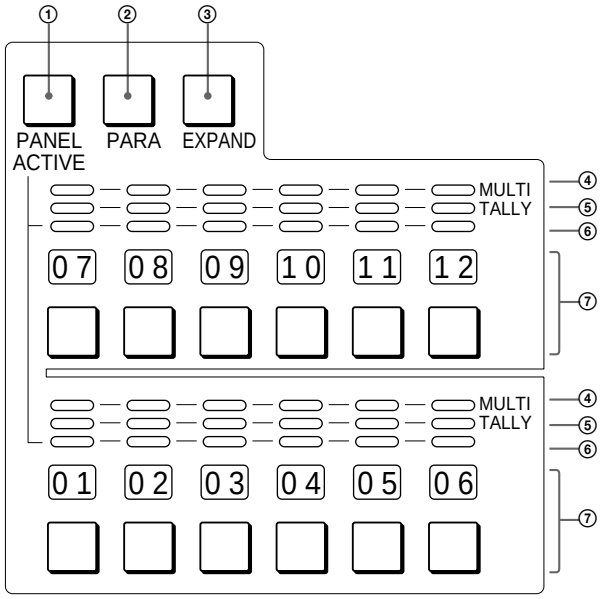
When one of these buttons is lit, pressing the output signal select buttons has effect only on the connector that corresponds to the lit button. The output signal from the other connector does not change. By lighting both the buttons, you can simultaneously select the output signal.

Note

If you light both the WF and PIX buttons when different signals are selected for the WF2 OUTPUT and PIX2 OUTPUT connectors, the output select buttons corresponding to the signals selected for either of the connectors flash. Press the button for the signal to be output to select it again.

For example, when you light both the WF and PIX buttons with R + B selected for PIX2 OUTPUT and B + G selected for WF2 OUTPUT, the R and G buttons will start flashing, while the B button will remain lit. To output R and G, press the R and G buttons. Each pressed button stops flashing and lights.

⓫ Camera select block



① PANEL ACTIVE button
Press and light up this button to permit the cameras selected with the camera select buttons to be controlled from this unit. The IRIS/MB ACTIVE button also lights up. If you press the button when lit, it goes dark and the operation panel of this unit is locked.

② PARA (parallel mode) button
Press and light up this button to activate Parallel mode, which enables concurrent operation with another control panel. If you press the button when lit, it goes dark and the Parallel mode is canceled.

③ EXPAND button
Press to select the group to be selected with the camera select buttons. Cameras 1 through 12 can be selected when this button is not lit, and cameras 13 through 24 can be selected when this button is lit.

Note

An appropriate camera command network unit (CNU- 700, etc.) is required to control multiple cameras using the camera select function.

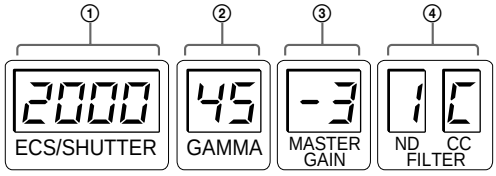
④ MULTI indicators
Show the Master/Slave status of the corresponding cameras 1 through 12 (when the EXPAND button is not lit) or 13 through 24 (when the EXPAND button is lit).
The indicator for the camera which is specified as the master for Master/Slave mode lights in green. The indicators for the slave cameras light in orange. They light in red during the auto setup of the corresponding cameras. If an error occurs during the auto setup and the operation is interrupted, they will flash in red.

⑤ TALLY indicators
Show the tally status of the corresponding cameras 1 through 12 (when the EXPAND button is not lit) or 13 through 24 (when the EXPAND button is lit). The corresponding indicator lights in red when a red tally is sent to a camera, and it lights in green when a green tally is sent. When both red and green tally are sent, it lights in orange. When a call signal is sent to the camera, the indicator rapidly flashes in red.

⑥ Active indicators
Show the control status of the corresponding cameras 1 through 12 (when the EXPAND button is not lit) or 13 through 24 (when the EXPAND button is lit). The indicators for the cameras under control of this unit light in green and the indicators for the cameras under control of another control panel light in orange.
An indicator whose corresponding camera (or camera control unit) is not connected does not light.
An indicator lights in red when an error is detected and the self-diagnostic functions are activated in the corresponding camera or camera control unit.

⑦ Camera select buttons and camera number indicators
Select the cameras to be controlled from this unit. Press and light up the button corresponding to each desired camera. When the EXPAND button is not lit, numbers 1 through 12 are displayed and cameras 1 through 12 are selected. When the EXPAND button is lit, numbers 13 through 24 are displayed and cameras 13 through 24 are selected.

⓬ Display window block



① ECS frequency/Shutter speed display window
The currently selected ECS frequency or step shutter speed is displayed in the window. Switching between the ECS mode and shutter mode is made using the Function menu. When both ECS and Shutter are off, “OFF” is displayed.

② GAMMA display window
The currently selected step gamma value is displayed in the window. The setting is made using the Function menu. The higher the gamma effect, the lower the value.

③ MASTER GAIN display window
The selected gain value (dB) of the camera is displayed in the window. The setting is made using the Function menu.

④ Filter display window
The currently selected ND and CC filters are displayed. Filter selection is made using the Function menu.

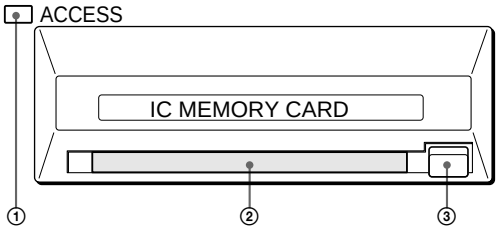
ND filter (Examples)

1: Clear
2: 1/4 ND
3: 1/8 ND
4: 1/16 ND
5: 1/64 ND

CC filter (Examples)

A: Cross filter
B: 3200K (clear)
C: 4300K
D: 6300K
E: 8000K

⓭ IC card insertion block



① ACCESS indicator
Shows the status of the IC memory card.

Indication	Meaning or Measures
Off	No card is inserted.
Lit in green	There is a card in the slot. (The battery condition is good.)
Lit in orange	The battery of the card in the slot begins losing its charge. Although the data are still maintained, replace the battery at the earliest opportunity.
Flashes in orange	The battery of the card in the slot is almost exhausted. While the card stays in the MSU-750, the MSU-750 supplies the power to the card. However when the card is ejected, the data cannot be maintained. Replace the battery before using.
Lit in red	Data are being read/written. If you eject the disc in this condition, the data is not guaranteed. All the data may be lost.

For battery replacement, refer to the instructions for the IC card.

② IC card slot
Insert an IC card (which conforms to PCMCIA) to store reference files and scene files of the video camera or CCU (SRAM CARD ONLY). When the card is correctly set, the ACCESS indicator lights in green.

Note

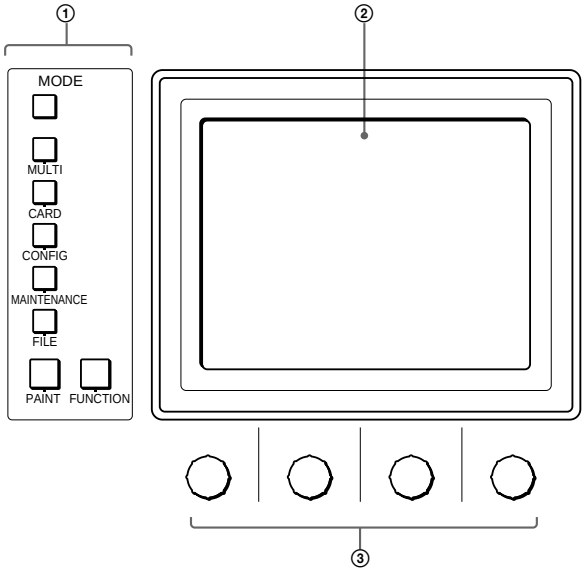
The data in the memory card is maintained by the battery built into the card. If the battery is exhausted, the data in the card will be lost. You can check the battery condition by the ACCESS indicator. If the battery becomes weak, replace the battery with a new one as soon as possible.

③ Eject button
Press to eject the inserted IC card.

Note

Do not eject a card when the ACCESS indicator is lit in red (it means that the data is being read from or written to the card). This may erase data stored in the card.

⓮ Menu operation block



① MODE (mode select) buttons
Select the menu mode. If you press and light one of these buttons, the menu for the selected mode appears on the EL display. When the lit button is pressed again, it goes dark and the menu on the display also disappears.
MULTI: Selects Multi-Control menu to set the requirements for Master/Slave mode to set up multiple cameras in synchronization.
CARD: Selects IC memory card menu to initialize IC cards.
CONFIG: Selects Configuration menu to configure this unit and the entire camera system.
MAINTENANCE: Maintenance mode to set various camera maintenance items and the H and SC phases of CCU, etc.
FILE: Selects File operation menu to retrieve and transfer reference files, lens files and scene files in the video camera or on IC cards.
PAINT: Selects Paint control menu to adjust various paint items, such as white, black and flare.
FUNCTION: Selects Function menu to control various camera and CCU functions.
② EL display/touch panel
Displays the menu selected with the MODE buttons and permits the displayed items to be adjusted.
③ Control knobs (rotary encoders)
Adjust the selected items on the touch panel.

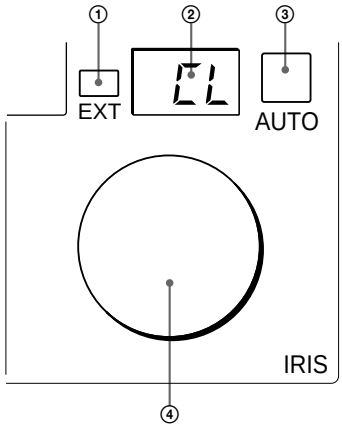
⓯ CALL button

Press to send a call signal to the video camera, on which the CALL button lights. The tally lamps on the camera and the red tally lamp on the CCU light when not lit, or go dark when lit. When the CALL button on the video camera is pressed, the CALL button on this unit lights and a buzzer sounds.

⓰ IRIS/MB ACTIVE (iris/master black active) button

Press and light up this button to enable the iris and master black adjustment functions of the unit. When the PANEL ACTIVE button is pressed, this button automatically lights. To disable only the iris/ master black control block of the panel, press this button so that it goes dark.

⓱ Iris control block



① EXT (lens extender) indicator
Lights when the lens extender is used.
② Iris display window
The iris value is displayed in f numbers. When the iris is closed, “CL” is displayed in the window.
③ AUTO button
Press and light the button to automatically adjust the iris according to the amount of input light (Auto Iris).
When this button is lit, the reference value for automatic iris adjustment can be set in a range of ±2f with the iris control. If you press the button when lit, it goes dark and manual iris adjustment is enabled.
Note
If the subject being used as the reference for automatic adjustment is lost while operating a camera having the skin tone auto iris function, the skin tone auto iris stops functioning, and the iris value at that time is maintained. The AUTO button then flashes. In this condition, not only is the iris not automatically adjusted but also it cannot be changed manually. When you wish to change the iris, turn Auto Iris off.
If Auto Iris is kept ON, the skin tone auto iris will start functioning when the subject for reference is resumed.

For the skin tone auto iris, refer to the system manual.

④ Iris control
When the AUTO button is not lit, you can adjust the iris manually by turning the control. The adjustment value is displayed in f numbers on the display. When the AUTO button is lit, the reference value for automatic iris adjustment can be set in a range of ±2f with this control.

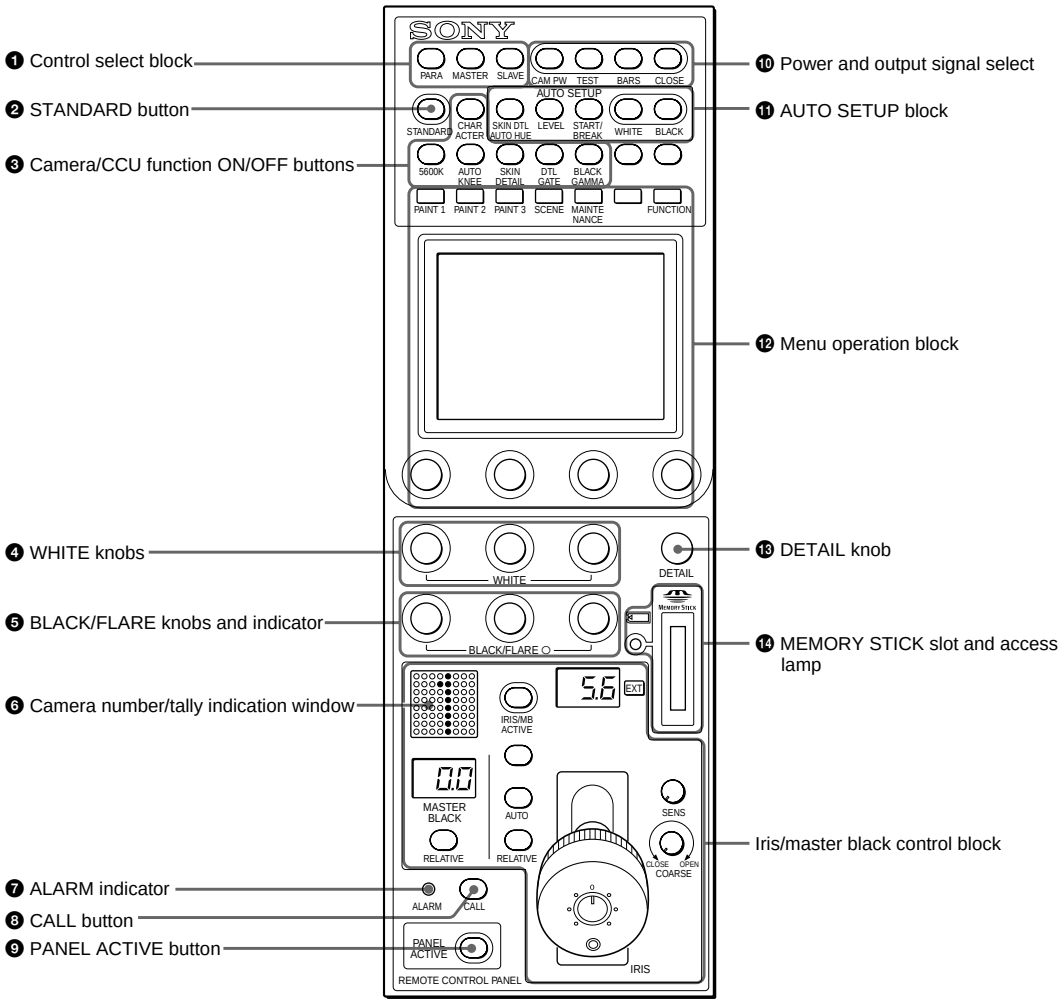
⓲ MASTER BLACK control block
Turn the control to adjust the master black level. The adjustment value is displayed in the display window.

⓳ Camera number/tally indication window
The number of the camera being controlled from this unit is displayed in orange. When a red tally signal is sent to the camera, the number is displayed in black and the background of the number lights in red. When a green tally signal is sent to the camera, the number is displayed in black and the background of the number lights in green. When both the red and green tally signals are simultaneously sent, the left half of the background lights in red and the right half lights in green.

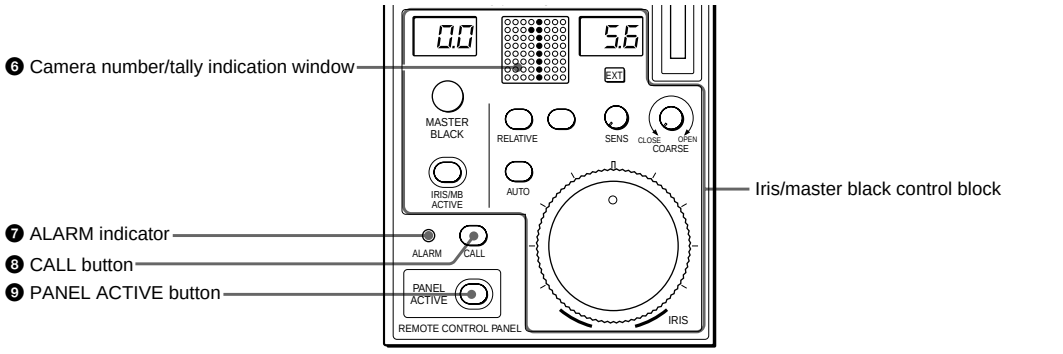
7-10. RCP-750/751, Remote Control Panel

7-10-1 *Operation Panel*

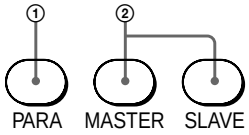
RCP-750



RCP-751



❶ Control select block



① PARA (parallel mode) button
This button lights when Parallel mode is active, in which concurrent operation with another control panel is possible. When this button is lit, all the buttons and controls on this panel except for the iris/master black control block are active, even if the PANEL ACTIVE button is not lit. If you press the button when lit, it goes dark and Parallel mode is cancelled.

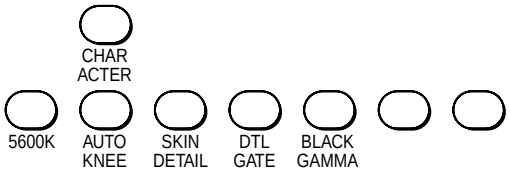
② MASTER and SLAVE buttons
When adjusting the white balance of multiple cameras in Master/Slave mode, designate the master camera or the slave cameras. Press and light up the MASTER button to specify the connected camera for the master. Press and light up the SLAVE button to specify the connected camera for the slave. The slave cameras follow the master camera settings. If you press a button when lit, it goes dark.

❷ STANDARD button

When you press this button, the video camera is initialized to its standard state and the button lights for several seconds. If you press the button while it lights, the video camera reverts to the state before the button was lit.

❸ Camera/CCU function ON/OFF buttons

Various functions of the video camera or the CCU/HDCU-series can be turned on and off from this panel.



5600K: 5600K -electronic color temperature conversion function
AUTO KNEE: Auto knee function. When this button is lit (ON), the knee point is automatically adjusted according to the light content of the picture.
SKIN DETAIL: Skin tone detail function
DTL GATE: Skin tone detail gate function. When this button is lit (ON), the adjustment range of the skin tone detail is displayed in white on the PIX (picture) monitor screen.
BLACK GAMMA: Black gamma function
CHARACTER: Self-diagnostic display function. When this button is lit (ON), the contents of the self-diagnosis of the CCU/HDCU-series are displayed on the monitor connected to the CHARACTER OUTPUT connector of the CCU/HDCU-series. The contents are also mixed to the video signal to be output from the PIX1 OUTPUT connector. Each time you press this button, the status changes as follows.
OFF → ON (page 1) → ON (page 2) . . .
→ ON (page n) → OFF

The contents of the self-diagnosis may be displayed when required even if this button is not lit. The right two buttons are for future use and do not function at present.

❹ WHITE (white balance manual adjustment) knobs

Used to manually adjust the white balance. From the left, the knobs are for R, G, and B signal adjustment.

❺ BLACK/FLARE (black balance/flare balance manual adjustment) knobs and indicator

Used to manually adjust the black balance (when the indicator is not lit) or the flare balance (when the indicator is lit). From the left, the knobs are for R, G, and B signal adjustment. Selection between black balance and flare balance is made using the Maintenance menu.

❻ Camera number/tally indication window

The number of the camera being controlled from this panel is displayed in orange. When a red tally signal is sent to the camera, the number is displayed in black and the background of the number lights in red. When a green tally signal is sent to the camera, the number is displayed in black and the background of the number lights in green. When both the red and green tally signals are simultaneously sent, the left half of the background lights in red and the right half lights in green.

❼ ALARM indicator

Lights when trouble occurs in the camera system and the self-diagnostic function activates at the video camera or the CCU/HDCU-series.

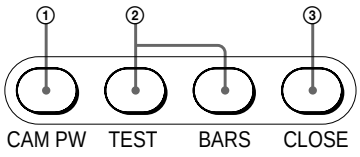
❽ CALL button

Press to send a call signal to the video camera, on which the CALL button lights. The tally lamps on the camera and the red tally lamp on the CCU/HDCU Series light when not lit, or go dark when lit. When the CALL button on the video camera is pressed, the CALL button on this panel lights and a buzzer sounds.

❾ PANEL ACTIVE button

Press and light up the button to permit this panel to control the camera system (Panel active status). The IRIS/MB ACTIVE button also lights. If you press this button so that it goes dark, the panel will be locked, preventing accidental misoperation.

❿ Power and output signal select block

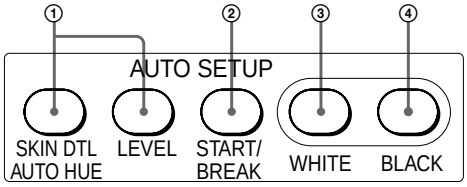


① CAM PW (camera power) button
Press and light up this button to turn the power supply to the video camera ON. (The button promptly flashes until the camera becomes ready for transmission.) When you press this button again, it starts flashing and the power supply is turned off.

② Signal output select buttons
Press and light up one of these buttons to activate the test signal generator of the video camera and send the respective signals.
TEST: To send a signal to test the video circuits
BARS: To send a color bar signal
Note
The BARS button takes priority to the TEST button. If the BARS button is lit, press the button to turn it dark before pressing the TEST button.

③ CLOSE button
Press and light the button to close the iris. To release the close mode, press the button again so that it goes dark.

⓫ AUTO SETUP block



① Auto adjustment item select buttons
Press and light up these buttons to select the items to be automatically adjusted.
SKIN DTL AUTO HUE: Skin tone detail automatic hue.
LEVEL: Gamma balance, knee point, master black level, etc.

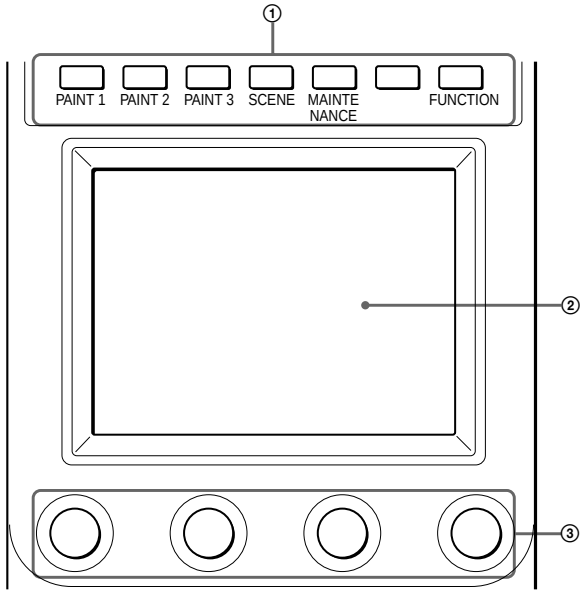
② START/BREAK button
Press to start automatic adjustment of the selected items. The button lights during adjustment and goes dark when adjustment is completed. If you press the button when lit, the automatic adjustment is canceled and the button flashes. To stop the flashing, press the button again.

③ WHITE (white balance) button
Press to automatically adjust the white balance. The button lights during adjustment and goes dark when adjustment is completed. If you press this button when lit or the START/BREAK button, the automatic adjustment is canceled and the button flashes. To stop the flashing, press the button again.

④ BLACK (black balance) button
Press to automatically adjust the black balance and black set. The button lights during adjustment and goes dark when adjustment is completed. If you press this button when lit or the START/BREAK button, the automatic adjustment is canceled and the button flashes. To stop the flashing, press the button again.

Note
If an error occurs during adjustment, the pressed button flashes.

⓬ Menu operation block



① MODE (mode select) buttons
Select the menu mode. If you press and light one of these buttons, the menu for the selected mode appears on the LCD.
PAINT 1/2/3: Each selects the Paint menu to adjust various paint items, such as white, black, and flare.
SCENE: Selects the File operation menu to register and retrieve scene files.
MAINTENANCE: Selects the Maintenance menu to set the H and SC phases of CCU/HDCU and operational conditions of this control panel.
FUNCTION: Selects the Function menu to control various camera and CCU/HDCU functions. When none of the buttons are lit, the status display is obtained.

② LCD/touch panel
Normally displays the statuses. When you press a MODE button, the corresponding menu is displayed to permit you to adjust the displayed items.

③ Control knobs (rotary encoders)
Adjust the selected items on the touch panel.

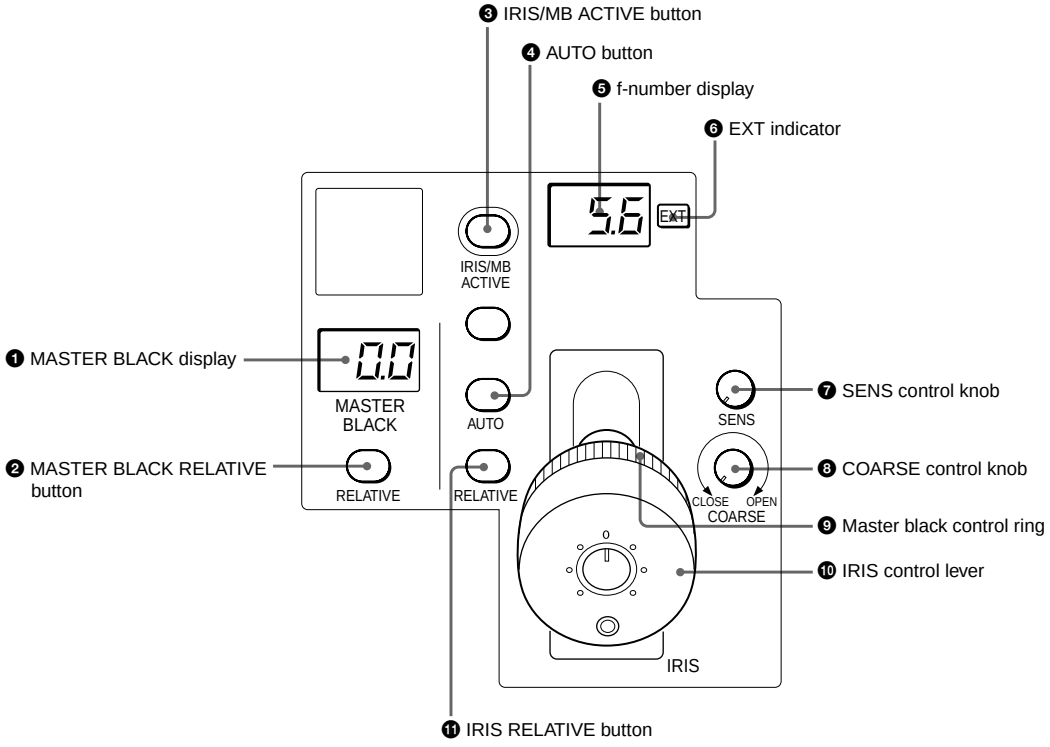
⓭ DETAIL knob

Used to adjust the detail level. You may select HD detail or SD detail using the Maintenance menu.

⓮ MEMORY STICK media card slot and access lamp

Insert a **Memory Stick** media card to store setting data, such as reference files and scene files of the video camera or CCU/HDCU.
The access lamp shows the status of the **Memory Stick** media card.
Off: No **Memory Stick** media card is inserted.
Lit in green: There is a **Memory Stick** media card in the slot. In this condition, you can safely eject the Memory Stick media card.
Lit in red: Data are being read/written. If you eject the Memory Stick media card in this condition, the data are not guaranteed. All the data may be lost.

7-10-2 *Iris/master black control block (RCP-750)*



❶ MASTER BLACK display
Displays the current master black setting in the range from -99 to +99.

❷ MASTER BLACK RELATIVE button
When the IRIS/MB ACTIVE button is lit, the master black adjustment mode can be selected with this button.
Press and light up the button for Relative mode, or press and turn it dark for Absolute mode. When the IRIS/MB ACTIVE button is not lit, Relative mode is automatically selected and this button is not operative.

❸ IRIS/MB ACTIVE (iris/master black active) button
Press and light up this button to enable the iris/master black control block of the panel. When the PANEL ACTIVE button is pressed, this button also lights. If you press this button so that it goes dark, the panel will be locked, preventing accidental misoperation.

❹ AUTO button
Press and light the button to automatically adjust the iris according to the amount of input light. When this button is lit, the reference value for automatic iris adjustment can be set in a range of ±1f with the iris control. If you press the button when lit, it goes dark and manual iris adjustment is enabled.

❺ f-number display
Displays the f-number of the current iris setting. When the iris is closed, “CL” is displayed.

❻ EXT (lens extender) indicator
Lights when the lens extender is used.

❼ SENS (sensitivity) control knob
Used for manual iris adjustment in Absolute mode. This control is not operative when Relative mode is selected.

❽ COARSE control knob
Used for manual iris adjustment.

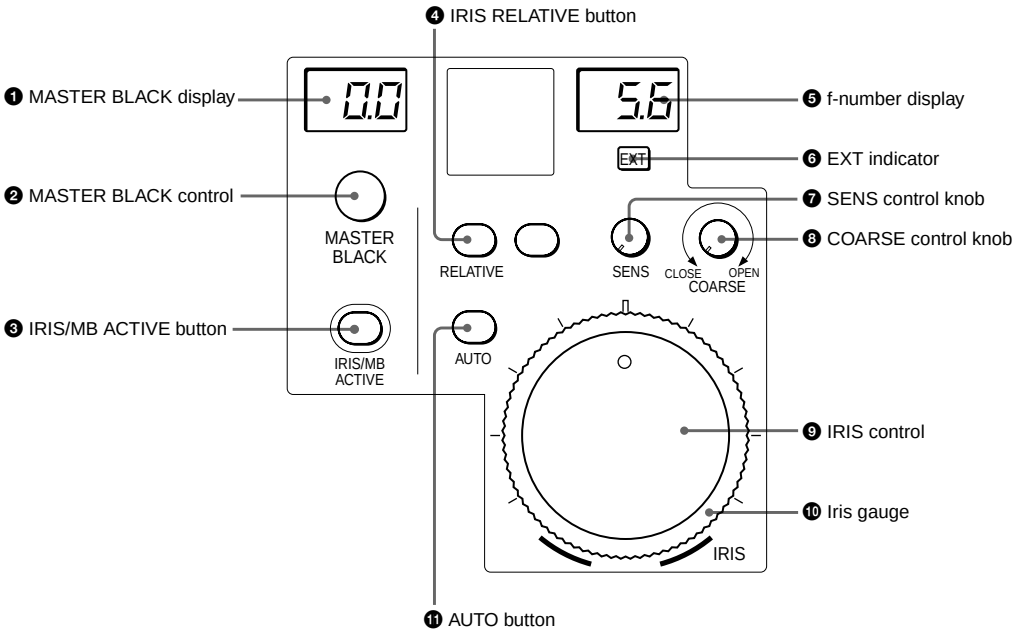
❾ Master black control ring
Turn to manually adjust the master black level.

❿ IRIS control lever
When the AUTO button is not lit, you can adjust the iris manually by moving the lever. When the AUTO button is lit, the reference value for automatic iris adjustment can be set in a range of ±1f with this lever.
See the following table “Iris adjustment functions.”

⓫ IRIS RELATIVE (iris relative) button
When the IRIS/MB ACTIVE button is lit, the iris adjustment mode can be selected with this button. Press and light up the button for Relative mode or press so that it goes dark for Absolute mode. When the IRIS/MB ACTIVE button is not lit, Relative mode is automatically selected and this button is not operative.

Iris adjustment functions		
	Relative mode (RELATIVE button lit)	**Absolute mode (RELATIVE button not lit)**
IRIS lever (RCP-750)/ IRIS control (RCP-751)	Adjusts the iris with relative values within 1/4 of the total range from OPEN to CLOSED.	Adjusts the iris within the variable range set by the SENS and COARSE
COARSE control	Adjusts the total range from OPEN to CLOSED in relative values.	Sets the lower limit for CLOSED.
SENS control	Does not function.	Sets the upper limit for OPEN according to CLOSED value set by the COARSE control.

7-10-3 *Iris/master black control block (RCP-751)*



❶ MASTER BLACK display
Displays the current master black setting in the range from –99 to +99.

❷ MASTER BLACK control
Manually adjust the master black level. The setting is displayed in the MASTER BLACK display.

❸ IRIS/MB ACTIVE (iris/master black active) button
Press and light up this button to enable the iris/master black control block of the panel. When the PANEL ACTIVE button is pressed, this button also lights. If you press this button so that it goes dark, the panel will be locked, preventing accidental misoperation.

❹ IRIS RELATIVE (iris relative) button
When the IRIS/MB ACTIVE button is lit, the iris adjustment mode can be selected with this button. Press and light up the button for Relative mode or press so that it goes dark for Absolute mode. When the IRIS/MB ACTIVE button is not lit, Relative mode is automatically selected and this button is not operative.

❺ f-number display
Displays the f number of the current iris setting. When the iris is closed, “CL” is displayed.

❻ EXT (lens extender) indicator
Lights when the lens extender is used.

❼ SENS (sensitivity) control knob
Used for manual iris adjustment in Absolute mode. This control is not operative when Relative mode is selected.

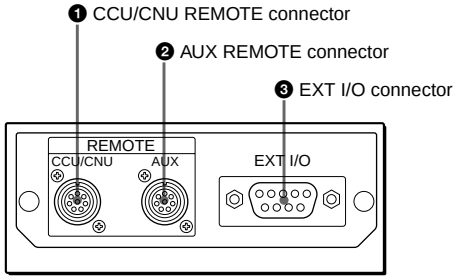
❽ COARSE control knob
Used for manual iris adjustment.

❾ IRIS control
When the AUTO button is not lit, you can adjust the iris manually by turning the control. When the AUTO button is lit, the reference value for automatic iris adjustment can be set in a range of ±1f with this control.

❿ Iris gauge
The white line on the gauge provides a click position for the IRIS control. Turn the gauge to set the line to the most frequently used iris position, and it can be used as the reference for manual iris adjustment. The gauge rotates infinitely in either direction. When no click position is required, set the line outside the rotation range of the IRIS control.

⓫ AUTO button
Press and light the button to automatically adjust the iris according to the amount of input light. When this button is lit, the reference value for automatic iris adjustment can be set in a range of ±1f with the iris control. If you press the button when lit, it goes dark and manual iris adjustment is enabled.

7-10-4 *Connector Panel*



❶ CCU/CNU REMOTE (camera control unit/camera command network unit remote) connector (8-pin)
Connect to the RCP/CNU connector of a camera control unit or the RCP connector of a camera command network unit.

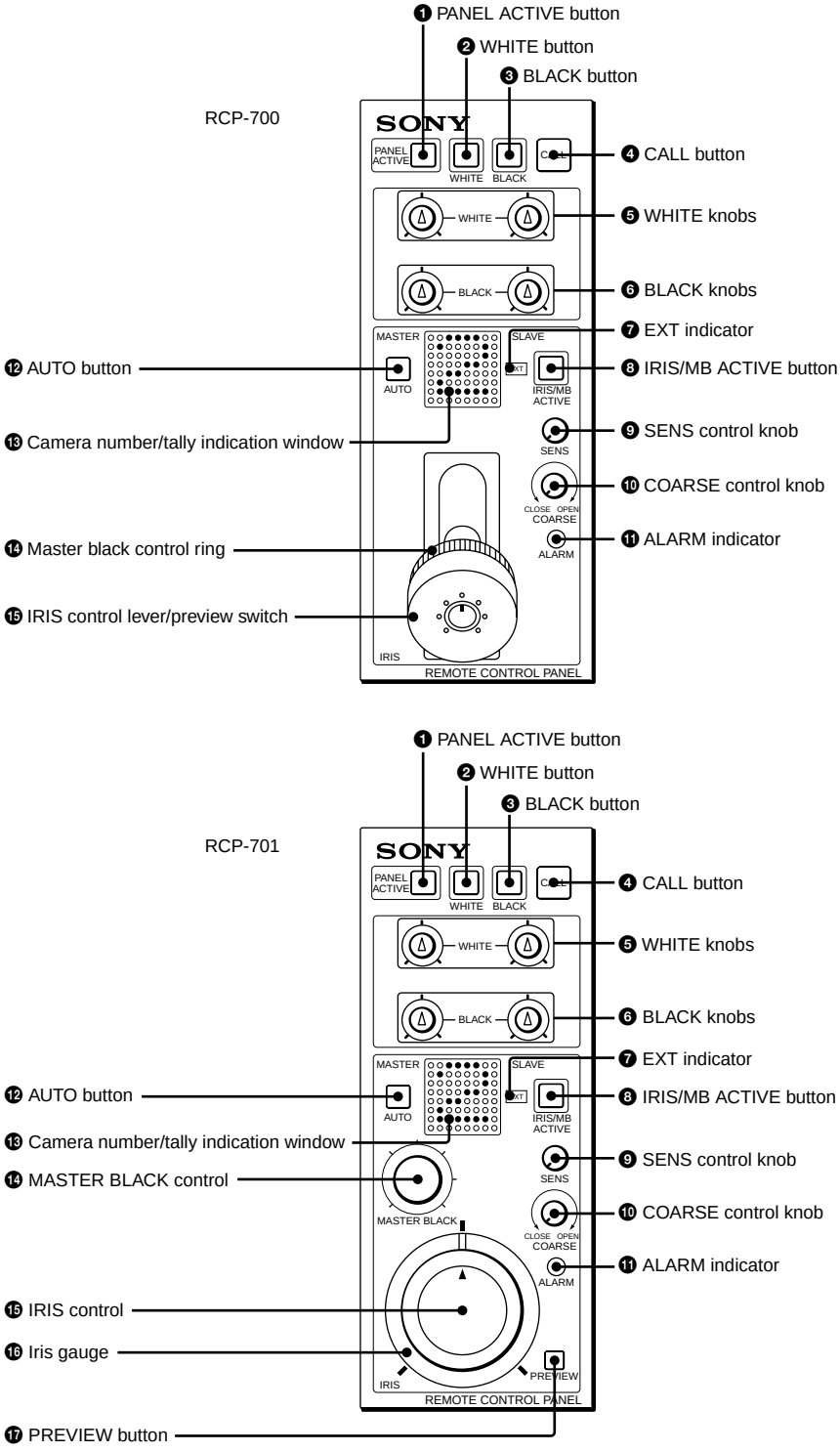
❷ AUX REMOTE (auxiliary remote) connector (8-pin)
Connect to the RCP-700/701.

❸ EXT I/O (external input/output) connector (9-pin)
With expansion functions added, this connector permits you to control an external device.

Caution
When installing this panel, provide a gap of 7 cm (3 inches) or more behind the connector panel to prevent damage to cables.

7-11. RCP-700/701, Remote Control Panel

7-11-1 *Operation Panel*



Parts common to the RCP-700/701

Items ❶ through ⓭ are common to the RCP-700 and RCP-701.

❶ PANEL ACTIVE button

Press and illuminate the button to permit this panel to control the camera system (Panel active status). The IRIS/MB ACTIVE button also illuminates.

❷ WHITE (white balance) button

Press to automatically adjust the white balance. The button is illuminated during adjustment and remains illuminated until the adjustments are completed. If you press this button while it is illuminated, or press the START/BREAK button, the automatic adjustment is canceled and the button flashes. To stop it flashing, press the button again.

Note
If an error occurs during adjustment, the selected button flashes.

❸ BLACK (black balance) button
Press to automatically adjust the black balance and black set. The button is illuminated during adjustment and remains illuminated until the adjustments are completed. If you press this button while it is illuminated, or press the START/BREAK button, the automatic adjustment is canceled and the button flashes. To stop it flashing, press the button again.
Note
If an error occurs during adjustment, the pressed button flashes.

❹ CALL button
Press to send a call signal to the camera, on which the CALL button is illuminated. The tally lamps on the camera and the red tally lamp on the CCU-700/A700AP are illuminated if they were not lit, or are turned off if they were already illuminated. When the CALL button on the camera is pressed, the CALL button on this panel illuminates and a buzzer sounds.

❺ WHITE (white balance manual adjustment) knobs
Used to manually adjust the white balance. Adjust the R and B signals, respectively.

❻ BLACK (black balance manual adjustment) knobs
Used to manually adjust the black balance. Adjust the R and B signals, respectively.

❼ EXT (lens extender) indicator
Lights when the lens extender is in use.

❽ IRIS/MB ACTIVE (iris/master black active) button
Press and illuminate this button to enable the iris/master black control block of the panel. When the PANEL ACTIVE button is pressed, this button also illuminates.

❾ SENS (sensitivity) control knob
Used for manual iris adjustment. See the table 'Iris adjustment functions'.

❿ COARSE control knob
Used for manual iris adjustment. See the table 'Iris adjustment functions'.

⓫ ALARM indicator
Lights when a problem occurs in the camera system and the self-diagnostic function is activated at the camera or the CCU-700A/700AP.

⓬ AUTO button
Press and illuminate the button and the iris automatically adjusts to the amount of input light. If you press the button when it is illuminated, the illumination is turned off and manual iris adjustment is enabled.

⓭ Camera number/tally indication window (incorporated with MASTER/SLAVE indications)
The number of the camera being controlled from this panel is displayed in orange. When a red tally signal is sent to the camera, its number is displayed in black against a red background. When a green tally signal is sent to the camera, the number is displayed in black against a green background. When the red and green tally signals are sent simultaneously, the left half of the background is illuminated red and the right half illuminated green. In Master/Slave mode, to adjust the white balance of multiple cameras the upper-left (MASTER) corner is illuminated orange when the camera being controlled from this panel is designated as the master unit, and the upper-right (SLAVE) corner is illuminated orange when designated as a slave unit.

RCP-700-exclusive features

⓮ Master black control ring
Turn to manually adjust the master black.

⓯ IRIS control lever/preview switch
When the AUTO button is not illuminated, you can adjust the iris manually by moving this lever. When the AUTO button is illuminated, the reference value for automatic iris adjustment can be set in a range of +/-1f stop with this lever. Push it axially to connect the key signal for preview at the PREVIEW connector. See the table "Iris adjustment functions."

Iris adjustment functions	
IRIS lever (RCP-700) IRIS control (RCP-701)	Adjust the iris within the variable controls.
COARSE control	Sets the lower limit for CLOSED.
SENS control	Sets the upper limit for OPEN according to the CLOSED value set by the COARSE control.

RCP-701-exclusive features

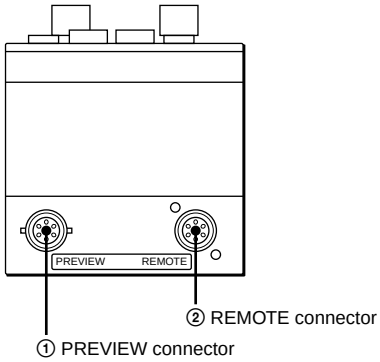
⓮ MASTER BLACK control
Turn to manually adjust the master black.

⓯ IRIS control
When the AUTO button is not illuminated, you can adjust the iris manually by turning the control. When the AUTO button is illuminated, the reference value for automatic iris adjustment can be set in a range of +/-1f stop with this control. See the table 'Iris adjustment functions'.

⓰ Iris gauge
The white line on the gauge provides a click position for the IRIS control. Turn the gauge to set the line to the most frequently used iris position, and it can be used as the reference for manual iris adjustment. The gauge rotates infinitely in either direction. When no click position is required, set the line outside the rotation range of the IRIS control.

⓱ PREVIEW button
Connects the preview signal to the PREVIEW connector.

Connector Panel

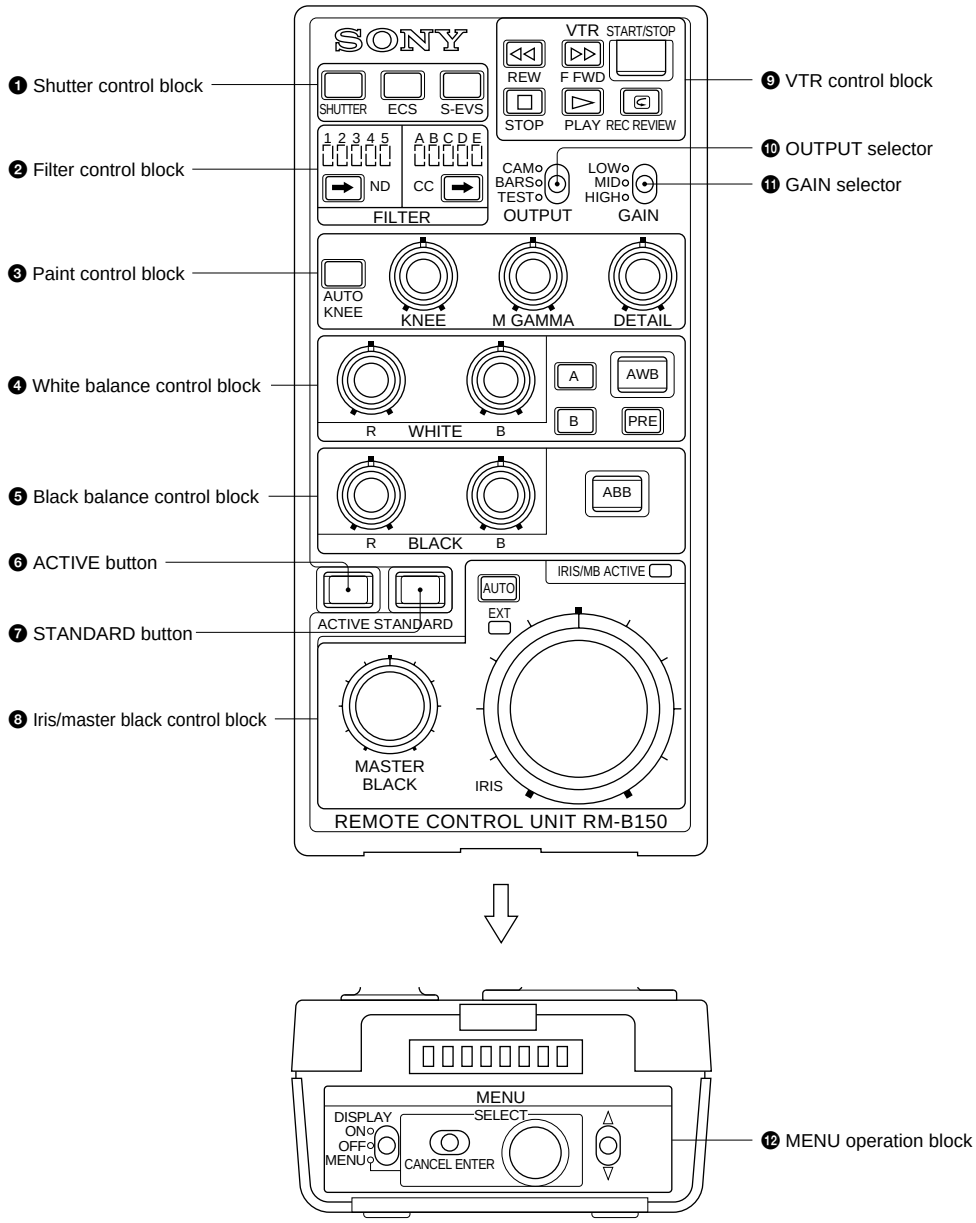


① PREVIEW connector (6-pin)
Supplies preview in. The RCP-701 receives the power from an external source, such as a video switcher, to illuminate the PREVIEW button through this connector.

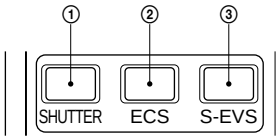
② REMOTE connector (8-pin)
Connect to the RCP/CNU connector of a CCU-700A/700AP, the RCP connector of a CNU-700 or the AUX connector of another RCP Series Remote Control Panel.

7-12. RM-B150, Hand-held Remote Control Unit

7-12-1 *Operation Panel*



❶ Shutter control block



① SHUTTER button (amber illumination)
Press and illuminate the button to set the camera to Shutter mode. The current shutter speed is shown on the display of the menu operation block for a few seconds. In Shutter mode, the shutter speed is adjusted with the menu select knob (rotary encoder).

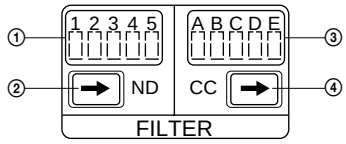
② ECS (Extended Clear Scan) button (amber illumination)
Press and illuminate the button to set the camera to ECS mode. The current ECS frequency is shown on the display of the menu operation block for a few seconds. In ECS mode, the ECS frequency is adjusted with the menu select knob (rotary encoder).

③ S-EVS (Super EVS) button (amber illumination)
Press and illuminate the button to set the camera to S-EVS mode. The current S-EVS value is shown on the display of the menu operation block for a few seconds. In S-EVS mode, the S-EVS value is adjusted with the menu select knob (rotary encoder).

Notes

- When you change the shutter speed, ECS frequency or S-EVS value in the corresponding mode, the menu block display shows it for a few seconds.
- When this unit is in RM Configuration Menu mode, the shutter speed, ECS frequency and S-EVS value cannot be adjusted.

❷ Filter control block



① ND (ND filter) indicators
The indicator corresponding to the currently selected ND filter illuminates.

② ND (ND filter select) button
Press and illuminate the button when it is not lit (Filter camera control mode) to enable filter selection from this unit. When this button is illuminated, the ND filter cyclically changes in the sequence of 1 → 2 → 3 → 4 → 5 → 1 → ... each time it is pressed.

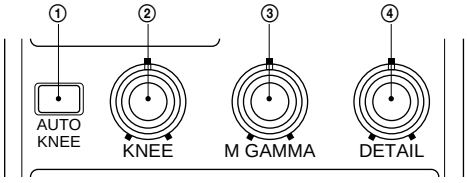
③ CC (color temperature conversion filter) indicators
The indicator that corresponds to the currently selected CC filter is illuminated.

④ CC (color temperature conversion filter select) button
Press and illuminate the button when it is not lit (Filter camera control mode) to enable filter selection from this unit. When this button is illuminated, the CC filter cyclically changes in the sequence of A → B → C → D → E → A → ... each time it is pressed.

Notes

- Once you press any of the filter select buttons, both buttons illuminate. The illumination is switched off when filter selection is made on the camera.
- The choice of filters that can be selected depends on the camera being used. For available filters, refer to the Operation Manual of the camera.
- For a camera with four filters, you can change the function of this button to skip 5 or E and switch from 4 to1 or from D to A using the RM Configuration menu. However, when the connected camera has an automatic filter-detection facility, setting with the RM Configuration menu is not required.

❸ Paint control block



① AUTO KNEE button (amber illumination)
This button is specified at the factory to turn the auto knee function on and off. Press and illuminate the button to turn the auto knee function on. However, you can use the RM Configuration menu to change the function that is turned on/off with this button

② KNEE control
The control is specified at the factory to adjust the master knee point. However, you can use the RM Configuration menu to change the function that is adjusted with this control.

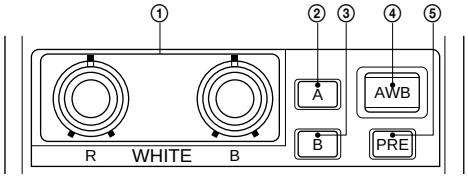
③ M GAMMA (master gamma) control
The control is specified at the factory to adjust the master gamma. However, you can use the RM Configuration menu to change the function that is adjusted with this control.

④ DETAIL control
The control is specified at the factory to adjust the detail level. However, you can use the RM Configuration menu to change the function that is adjusted with this control.

Note

The adjustment mode of the above three controls is specified at the factory as Relative mode, which can be changed to Absolute mode using the RM Configuration menu. The center click position of each control is the reference position in Relative mode. The adjustment range in Relative mode is also selected using the menu.

❹ White balance control block



① WHITE (white balance) controls
Adjusts the R/B white balance. The adjustment mode of these controls is specified at the factory as Relative mode, which can be changed to Absolute mode using the RM Configuration menu. See 'Settings on the RM Configuration Menu'.

② A (memory A) button (amber illumination)
Press and illuminate the button to obtain the white balance setting stored in memory A of the camera (Memory A mode). When this button is illuminated, adjustments made to the white balance are stored in memory A. Press the button again to release Memory A mode.

③ B (memory B) button (amber illumination)
Press and illuminate the button to obtain the white balance setting stored in memory B of the camera (Memory B mode). When this button is illuminated, adjustments made to the white balance are stored in memory B. Press the button again to release Memory B mode.

④ AWB (auto white balance) button (red illumination)
Press to start automatic adjustment of the selected items. The button is illuminated during adjustment and this is turned off when adjustment is complete. If you press the button while it is illuminated, the automatic adjustment is canceled and the button flashes. To stop it flashing, press the button again.

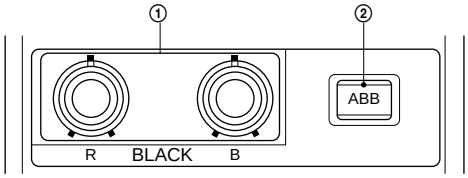
⑤ PRE (preset) button (amber illumination)
Press and illuminate the button to fix the white balance to 3200K (Preset mode). Press the button again to release Preset mode.

Note

In Preset mode, manual adjustment with the WHITE controls and automatic adjustment with the AWB button are both disabled. When the adjustment mode of the WHITE controls is

specified as Absolute mode, the Memory A, B and AWB buttons are disabled.

❺ Black balance control block



① BLACK (black balance) controls
These controls are specified at the factory to adjust the R/B black balance. Using the RM Configuration menu, you can change the function of these controls to adjust the R/B flare balance. The adjustment mode of these controls is specified at the factory as Relative mode, which can also be changed to Absolute mode using the menu. See 'Settings on the RM Configuration Menu'.

② ABB (auto black balance) button (red illumination)
Press to automatically adjust the black balance and black set. The button is illuminated during adjustment and this is turned off when the adjustment is completed. If you press this button when it is illuminated, the automatic adjustment is canceled, and the button flashes. To stop the flashing, press the button again.

Note

When the adjustment mode of the BLACK controls is specified as Absolute mode, automatic black balance adjustment with the ABB button is disabled.

❻ ACTIVE button (green illumination)

Press to select the control mode for the connected camera system. Each time you press the button with the factory setting, the control mode cyclically switches between FULL, PART, and LOCK modes.

FULL mode: All controls from this unit are enabled (panel active status). Both this button and the IRIS/MB ACTIVE indicator in the iris/master black control block are illuminated.

PART mode: Controls only from the iris/master black control block are enabled (iris/master black active status). This button is not illuminated, but the IRIS/MB ACTIVE indicator stays lit.

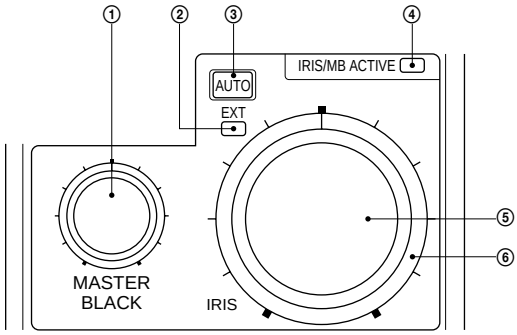
LOCK mode: All controls from this unit are disabled (lock status). Neither this button nor the IRIS/MB ACTIVE indicator in the iris/master black control are illuminated.

Using the RM Configuration menu, the function of this button can be changed to switch only between FULL and LOCK modes. The RM Configuration menu operation is possible in any mode. See 'Settings on the RM Configuration Menu'.

❼ STANDARD button (green illumination)

When this button is pressed, it remains illuminated for several seconds while the camera is initialized to its standard state. If the button is pressed while illuminated, the camera reverts to the state before the button was illuminated.

❽ Iris/master black control block



① MASTER BLACK control
Manually adjusts the master black level. The adjustment mode of this control is specified at the factory as Absolute mode, which can be changed to Relative mode using the RM Configuration menu. See 'Settings on the RM Configuration Menu'.

② EXT (lens extender) indicator (amber illumination)
Lights when the lens extender is in use.

③ AUTO button (amber illumination)
Press and illuminate the button to automatically adjust the iris according to the amount of input light. If you press the button when it is illuminated, this is turned off and manual iris adjustment is enabled.

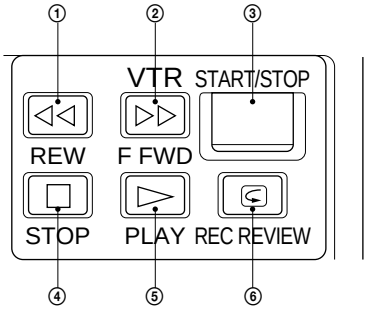
④ IRIS/MB ACTIVE (iris/master black active) indicator (green illumination)
Illuminated when the control mode is set as FULL or PART mode with the ACTIVE button. When this indicator is illuminated, iris/master black controls from this unit are enabled.

⑤ IRIS control
When the AUTO button is not illuminated, you can adjust the iris manually by turning this control. When the AUTO button is illuminated you can fine-adjust the reference value for the automatic iris adjustment in a range of +/-2 f stops with this control. The adjustment mode of this control is specified at the factory as Absolute mode, which can also be changed to Relative mode using the RM Configuration menu. See 'Settings on the RM Configuration Menu'.

⑥ Iris gauge
Turn the gauge to set the white line to the most - frequently used iris position, and it can be used as the reference for the manual iris adjustment.

❾ VTR control block

Controls VTR operations.



① ◁◁ REW (rewind) button (amber illumination): Press this button to start a rewind operation. The button is illuminated.
② ▷▷ F FWD (fast forward) button (amber illumination): Press this button to start a fast-forward operation. The button is illuminated.
③ START/STOP button (red illumination): Press this button to start a recording operation. The button is illuminated. Pressing this button when it is illuminated stops the VTR recording.
④ □ STOP button: Press to stop a rewind, fast-forward or playback operation.
⑤ ▷ PLAY button (amber illumination): Press this button to start a playback operation. The button is illuminated.
⑥ REC REVIEW (recording review) button (amber illumination): Press this button to execute a recording review operation. The button is illuminated.

Notes

- When the START/STOP button is illuminated, the other buttons in the VTR control block are deactivated. To activate the other buttons, first press the START/STOP button to cancel the Recording mode.
- Some of the VTR control functions of this unit may be disabled depending on the combination of camera and VTR. For details, ask your official Sony representative.

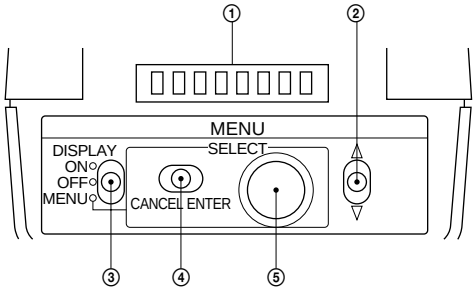
⑩ OUTPUT selector

Selects the output signal from the connected camera.
CAM: Picture output
BARS: Color bar signal
TEST: Test signals for a video circuit check (the signal is selected using the RM Configuration Menu). See 'Settings on the RM Configuration Menu'.

⑪ GAIN (master gain) selector

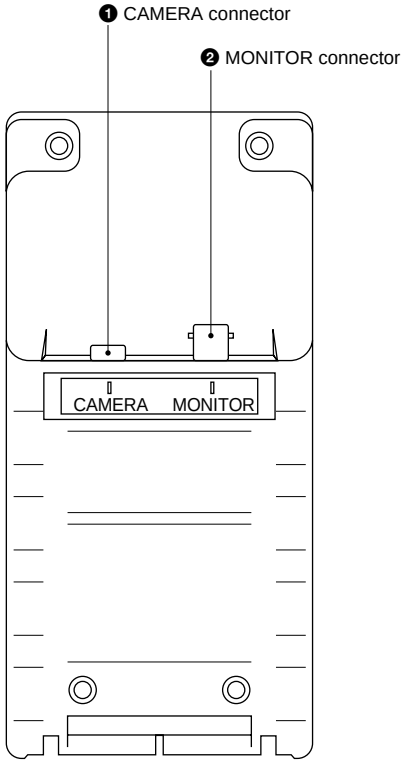
Selects the video gain from three values (LOW, MID, HIGH) according to the illumination of the subject to be shot. Normally, these three gain settings are those chosen in the camera set-up. Alternative gain settings may be defined by using the configuration menu of the RM-B150 Operation Panel. See 'Settings on the RM Configuration Menu'.

⑫ MENU operation block



① Menu display (8 columns)
In normal operation mode, the display illuminates to show the shutter speed, ECS frequency or S-EVS value only when the shutter control block is operated. When you select the RM Configuration menu, the display shows menu items, set values, and various information depending on operations.
② RM Configuration switch
Selects the RM Configuration menu. When this switch is pushed in the ▼ direction, the 'Basic menu' is selected.
When this switch is pushed in the ▼ direction, while holding the CANCEL/ENTER switch at ENTER, the 'Detail menu' is selected. The RM Configuration menu is switched off by pushing this switch in the ▲ direction.
③ DISPLAY switch
For control of the camera's menu.
ON: Shows the character display function of the camera.
OFF: Shows the character display function of the camera.
MENU: Sets the camera into the camera menu mode.
④ CANCEL/ENTER switch
To register or cancel a menu item or value selection.
⑤ Menu select knob (rotary encoder)
In normal operation, the shutter speed, ECS frequency or S-EVS value can be adjusted with this knob. In the camera's menu mode the knob is used for camera menu operations. On the RM Configuration menu, turn the knob to select menu categories, subcategories, set items, set values and other information on the menu display.
For operations on the RM Configuration menu, see 'Settings on the RM Configuration Menu'.
For operations on the camera's menu, refer to the Operation Manual of the camera or the System Manual.

7-12-2 *Connector Panel*



❶ CAMERA connector (8-pin)

Connect to the camera using the supplied remote cable.

❷ MONITOR connector (BNC)

Connect to a color monitor to observe the signal from the camera.

Settings on the RM Configuration Menu

The RM-B150 is provided with an RM Configuration Menu mode. This enables you to select and adjust the function of the buttons and controls on the panel and to check various information. At the beginning of an RM Configuration menu operation, select 'Basic menu' or 'Detail menu' and proceed with operations as desired.

Operation

For menu operations, use the menu operation block of the unit to start the menu operation.

To select the Basic menu

Push the RM Configuration switch in the ▼ direction. The menu display shows 'Cbl Comp' (the first category of the Basic menu).

To select the Detail menu

Push the RM Configuration switch in the ▼ direction while holding the CANCEL/ENTER switch toward ENTER. The menu display shows 'Mode Set' (the first category of the Detail menu).

Note

The RM Diag category of the Detail menu is used to display various information, to check operations and reset the menu. For items for which the operation procedure differs, the procedure is discussed in the corresponding 'Contents' column.

To make settings on the menu

1. Turn the menu select knob until the required category appears on the display.
 Example: Mode Set → ... → VR Setup
2. Push the CANCEL/ENTER switch toward ENTER to register your selection made in step 1. The first subcategory of the selected category appears.
 Example: Knee
 If there is no subcategory belonging to the selected category, the first setting (or display) item of that category appears on the display (proceed to step 5).
3. Turn the menu select knob until the desired subcategory appears on the display.
 Example: Knee → ... → Iris
4. Push the CANCEL/ENTER switch toward ENTER to register your selection made in step 3. (Pushing toward CANCEL reverses the operation.) The first setting item of the selected subcategory and its current setting appear.
 Example: Ctrl: Abs
5. Turn the menu select knob until the desired setting (or display) item appears on the display.
 Example: Ctrl: Abs → ... → Min : Cls
 For a setting item, make your setting.
6. Push the CANCEL/ENTER switch toward ENTER to register your setting made in step 5.
7. Turn the menu select knob until the desired category appears on the display.
 Example: Min : Cls → ... → Min : 22
8. Push the CANCEL/ENTER switch toward ENTER to register your setting made in step 7. (Pushing toward CANCEL cancels the setting in step 7.) To continue setting items, repeat steps 5 to 8.

To end the menu operation

Push the RM Configuration switch in the ▲ direction.

Notes

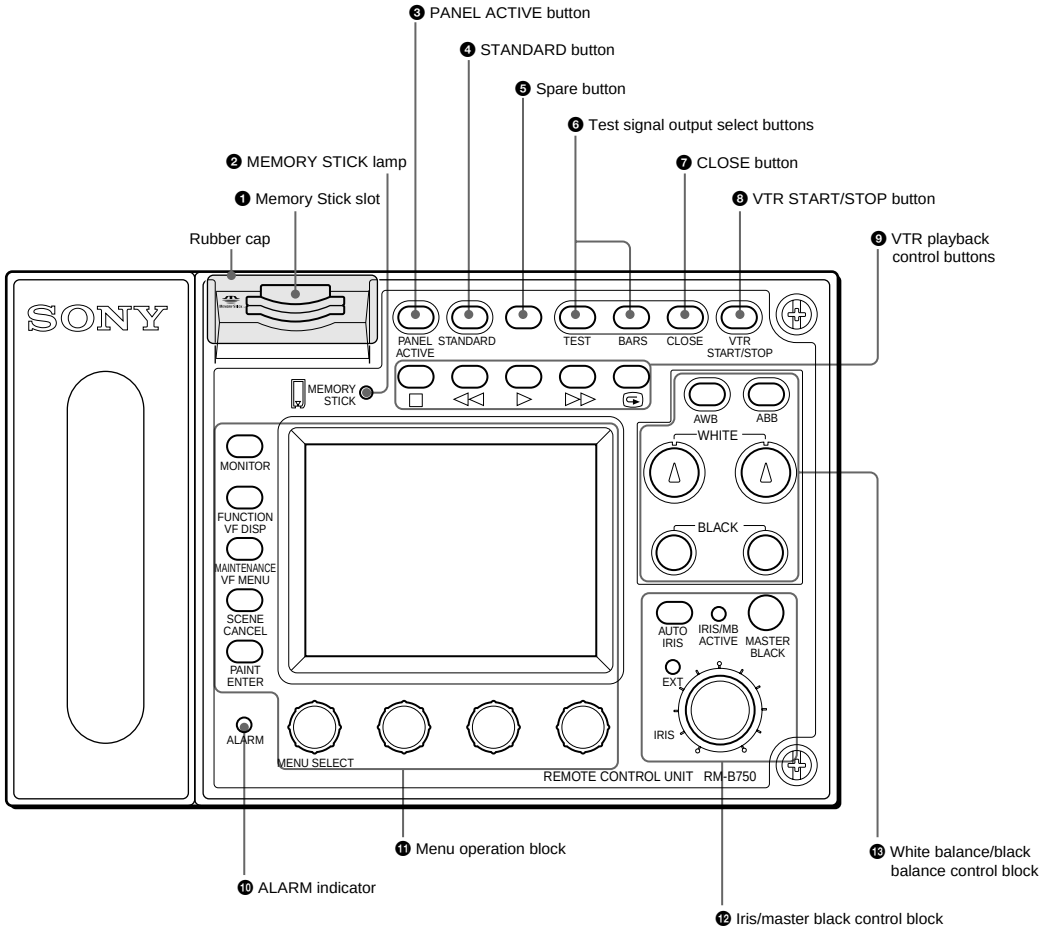
- If an operation has not been made in Menu mode after one minute, the menu automatically exits.
- Values set on the RM Configuration menu are stored in memory when you exit the menu operation. Be sure to exit the operation before turning the power off.

Basic Menu (An underlined item under 'Setting' indicates the factory setting.)

Category	Subcategory	Item	Setting	Contents
Cbl Comp	–	Len	10m, 50m, 100m	Sets the cable length for the cable compensation circuit
Bright	–	LED	10 to 99 (50)	Sets the brightness of the LEDs on the control panel
	–	Disp	10 to 99 (50)	Sets the brightness of the menu display
Buzzer	–	Lvl	10 to 99 (50)	Sets the sound volume of the buzzer
	–	Out	On, Off	Turns buzzer output on and off

7-13. RM-B750, Hand-held Remote Control Unit

7-13-1 *Operation Panel*



❶ Memory Stick slot
Insert a **Memory Stick** to store setting data, such as reference files and scene files of the video camera or camera control unit.

❷ MEMORY STICK (Memory Stick access) lamp
The lamp shows the status of the **Memory Stick**.
Off: No Memory Stick is inserted.
Lit in green: There is a Memory Stick in the slot. In this condition, you can safely eject the Memory Stick.
Lit in red: Data are being read/written. If you eject the Memory Stick in this condition, the data are not guaranteed. All the data may be lost.

❸ PANEL ACTIVE button
Press to select the control mode for the connected camera system. Each time you press the button with the factory setting, the control mode cyclically switches among FULL, PART, and LOCK modes.
FULL mode: All controls from this unit are enabled (panel active status). Both this button and the IRIS/MB ACTIVE indicator in the iris/master black control block light.
PART mode: Controls only from the iris/master black control block are enabled (iris/master black active status). This button goes dark, but the IRIS/MB ACTIVE indicator stays lit.
LOCK mode: All controls from this unit are disabled (lock status). Both this button and the IRIS/MB ACTIVE indicator in the iris/master black control block go dark.
Using the RM Configuration menu under the Maintenance menu, the function of this button can be changed to switch only between FULL and LOCK modes. The RM Configuration menu operation is possible in any mode.

❹ STANDARD button
When you press this button, the video camera is initialized to its standard state, and the button lights for several seconds. If you press the button while lit, the video camera retrieves the state before the button was lit.

❺ Spare button
For future use.

❻ Test signal output select buttons
Press and light up one of these buttons to activate the test signal generator of the video camera and send the respective signals.
TEST: To send a signal to test the video circuits. You can select the kind of the test signal to be output using the RM Configuration menu under the Maintenance menu.
BARS: To send a color bar signal

Note
The BARS button takes priority to the TEST button. If the BARS button is lit, press the button to turn it dark before pressing the TEST button.

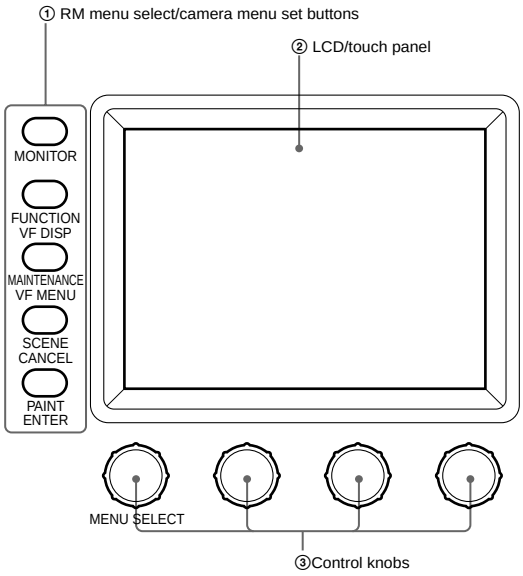
❼ CLOSE button
Press and light the button to close the iris. To release the close mode, press the button again so that it goes dark.

❽ VTR START/STOP button
Press and light up this button to start a recording operation. When you press the button when lit, it goes dark, and recording stops. Using the RM Configuration menu under the Maintenance menu, you can assign the CALL button function to this button. In this case, press to send a call signal to the video camera, on which the CALL button lights. The tally lamps on the camera and the red tally lamp on the camera control unit light when not lit, or go dark when lit. When the CALL button on the video camera is pressed, the button on this unit lights and a buzzer sounds.

❾ VTR playback control buttons
Controls VTR playback operations.
☐ (stop) button
Press to stop a rewind, fast-forward or playback operation.
◁◁ (rewind) button
Press and light this button to start a rewind operation.
▷ (play) button
Press and light this button to start a playback operation.
▷▷ (fast forward) button
Press and light this button to start a fast-forward operation.
(recording review) button
Press and light this button to execute a recording review operation.
Notes
- When the VTR START/STOP button is lit, these buttons are deactivated. To activate the buttons, first press the VTR START/STOP button to cancel Recording mode.
- A part of the VTR control functions of this unit may be disabled depending on the combination of camera and VTR. For details, ask your Sony dealer.

❿ ALARM indicator
Flashes or lights in red when trouble occurs in the camera system and the self-diagnostic function activates at the video camera or the camera control unit.

⓫ Menu operation block

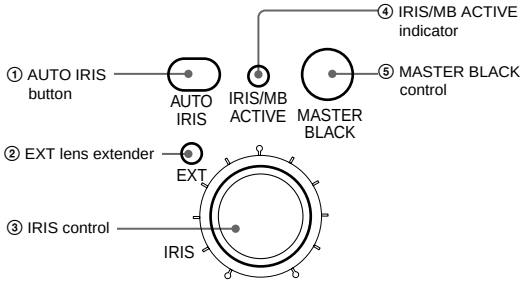


① RM menu select/camera menu set buttons
MONITOR: When this button is unlit, you can select the menus of this unit using the other buttons (RM Menu mode in which the functions indicated with white letters for the buttons are valid). Press and light this button to display the video signal (SDTV signal only) from the connected camera on the LCD. This also permits the menus of the camera to be operated from this unit (the functions indicated with blue letters for the buttons and the leftmost control knob are valid).
FUNCTION/VF DISP (viewfinder display): With the MONITOR button unlit, the Function menu of this unit appears on the LCD when you press and light this button. With the MONITOR button lit, the character display of the camera is turned on when you press and light this button.
MAINTENANCE/VF MENU (viewfinder menu): With the MONITOR button unlit, the Maintenance menu of this unit appears on the LCD when you press and light this button. With the MONITOR button lit, the unit enters Camera Menu mode when you press and light this button. The main menu of the camera appears on the LCD.
SCENE/CANCEL: With the MONITOR button unlit, the Scene File menu of this unit appears on the LCD when you press and light this button. With the MONITOR button lit, you can cancel the setting of the camera menu item selected on the LCD by pressing this button.
PAINT/ENTER: With the MONITOR button unlit, the Paint menu of this unit appears on the LCD when you press and light this button. With the MONITOR button lit, you can register the setting of the camera menu item selected on the LCD by pressing this button. When none of the buttons are lit, the status display is obtained.

② LCD/touch panel
Normally displays the statuses. When you press and light the MONITOR button, it displays the video signal from the connected camera (SDTV signal only. HDTV signal will not be displayed.). In RM Menu or Camera Menu mode, the selected menu is displayed to permit you to operate the menu.

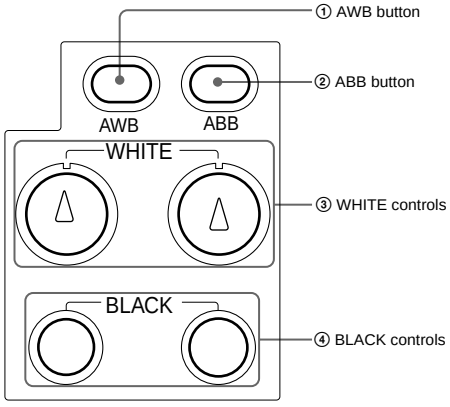
③ Control knobs (rotary encoders)
In RM Menu mode, adjust the selected items on the touch panel. In Camera Menu mode, select and adjust the menu items using the leftmost knob.

⓬ Iris/master black control block



① AUTO IRIS button
Press and light the button to automatically adjust the iris according to the amount of input light. If you press the button when lit, it goes dark, and manual iris adjustment is enabled.
② EXT (lens extender) indicator
Lights when the lens extender is used on the connected camera.
③ IRIS control
When the AUTO IRIS button is not lit, you can adjust the iris manually by turning the control. When the AUTO IRIS button is lit, you can fine-adjust the reference value for automatic iris adjustment in a range of ±2f with this control. The adjustment mode of this control is specified at the factory as Absolute mode, which can also be changed to Relative mode using the RM Configuration menu under the Maintenance menu.
④ IRIS/MB ACTIVE (iris/master black active) indicator
Lights when the control mode is set as FULL or PART mode with the PANEL ACTIVE button. When this indicator is lit, iris/master black controls from this unit are enabled.
⑤ MASTER BLACK control
Manually adjusts the master black level. The adjustment mode of this control is specified at the factory as Relative mode, which can be changed to Absolute mode using the RM Configuration menu under the Maintenance menu.

⓭ White balance/black balance control block



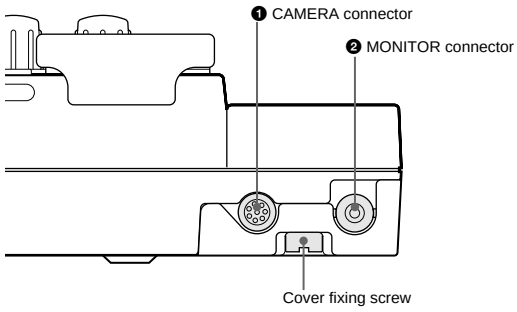
① AWB (auto white balance) button
Press to automatically adjust the white balance. The button lights during adjustment and goes dark when adjustment is completed. If you press this button when lit, the automatic adjustment is canceled, and the button flashes. To stop the flashing, press the button again.
② ABB (auto black balance) button
Press to automatically adjust the black balance and black set. The button lights during adjustment and goes dark when adjustment is completed. If you press this button when lit, the automatic adjustment is canceled, and the button flashes. To stop the flashing, press the button again.

Note

When the adjustment mode of the BLACK controls is specified as Absolute mode, automatic black balance adjustment with ABB button is disabled.

③ WHITE (white balance) controls
Adjust the R/B white balance. The adjustment mode of these controls is specified at the factory as Relative mode, which can be changed to Absolute mode using the RM Configuration menu under the Maintenance menu.
④ BLACK (black balance) controls
Adjust the R/B black balance. The adjustment mode of these controls is specified at the factory as Relative mode, which can be changed to Absolute mode using the RM Configuration menu under the Maintenance menu.

7-13-2 *Connector Panel*



❶ CAMERA connector (8-pin)

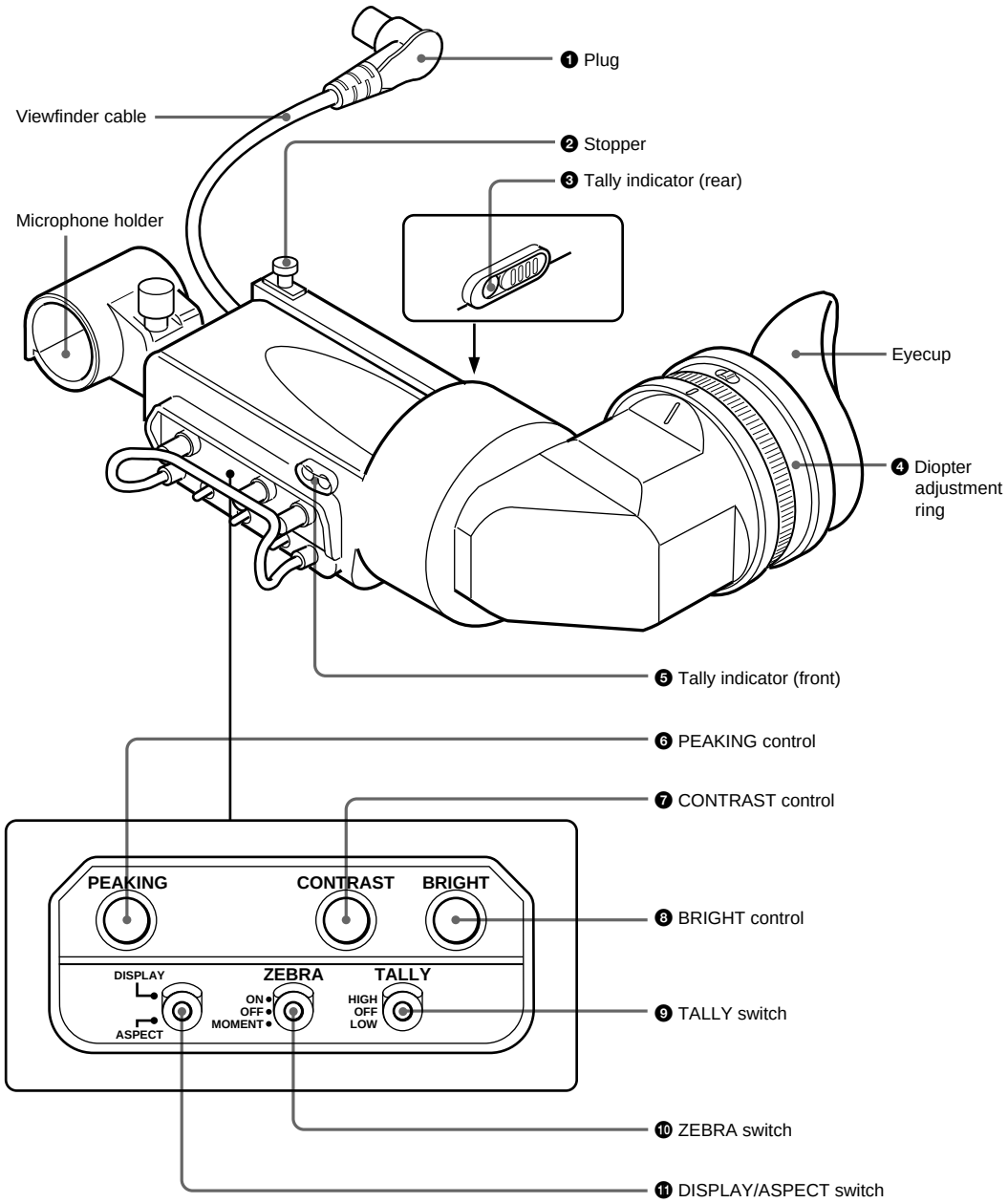
Connect to the camera using the supplied remote control cable.

❷ MONITOR connector (BNC)

Connect to a color monitor to observe the signal from the camera.

7-14. HDVF-20A, HD Electronic Viewfinder

7-14-1 *Appearance*



❶ Plug
Connect to the VF connector on the camera.

❷ Stopper
Prevents the viewfinder from coming off the camera when it is slid from side to side.

❸ Tally indicator (rear)
Lights up when the camera receives a tally control signal. This indicator can be covered when not in use.

❹ Diopter adjustment ring
Allows for optimal focus adjustment.

❺ Tally indicator (front)
Lights up when the camera receives a tally control signal. Set the TALLY switch ❾ to OFF when not in use. The brightness can also be adjusted with the TALLY switch ❾.

❻ PEAKING control
Turning this control clockwise adjusts the picture sharpness, and makes focusing easier. This control has no effect on the output signals of the camera.

❼ CONTRAST control
Adjusts the contrast of the screen. This control has no effect on the output signals of the camera.

❽ BRIGHT control
Adjusts the brightness of the screen. This control has no effect on the output signals of the camera.

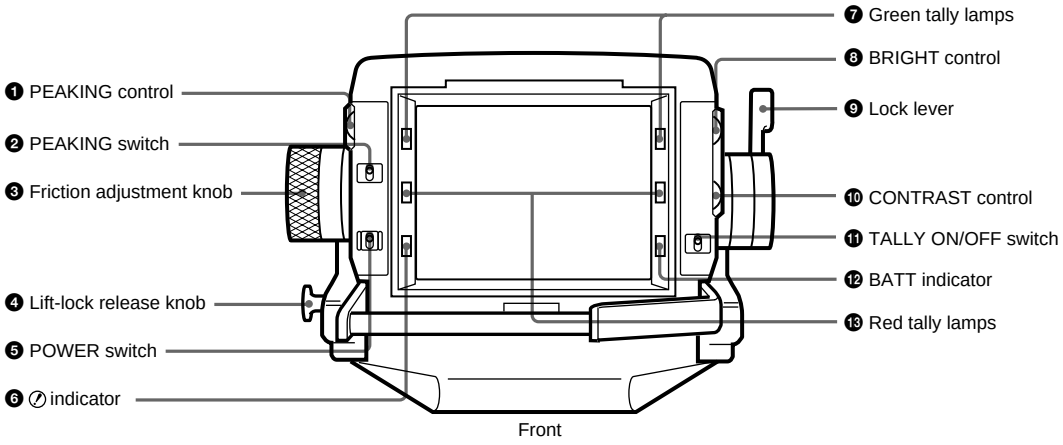
❾ TALLY switch
Controls the tally indicator ❺ located on the front of the viewfinder.
HIGH: The tally indicator brightness is set to high.
OFF: The tally indicator is disabled.
LOW: The tally indicator brightness is set to low.

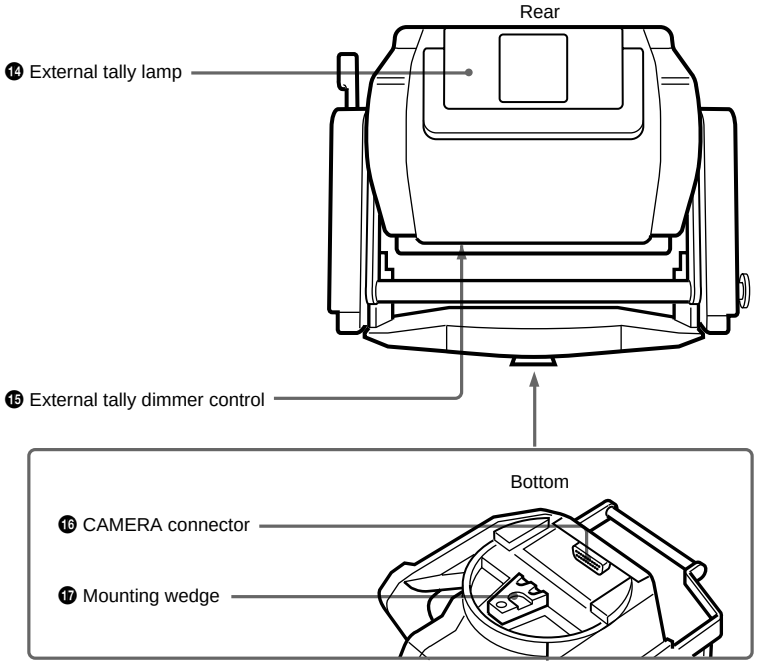
❿ ZEBRA (zebra pattern) switch
Controls the zebra pattern display on the viewfinder screen as follows:
ON: A zebra pattern appears and stays.
OFF: The zebra pattern disappears.
MOMENT: A zebra pattern appears and stays for about 5 seconds.

⓫ DISPLAY/ASPECT switch
Turns the marker indication on and off, and switches between 4:3 and 16:9 aspect ratios for viewfinder screen display.
DISPLAY: When the marker indication is enabled with the camera, the marker indication on the viewfinder screen turns on and off every time you push the switch up to this position.
ASPECT: Each push of the switch down to this position toggles the mask display on and off.

7-15. HDVF-700A, HD Electronic Viewfinder

7-15-1 *Appearance*





❶ PEAKING control *1
When the PEAKING switch ❷ is set to ON, this control can be used to sharpen the edges in the picture. Turning the control clockwise will increase the sharpness. The peaking can be adjusted from 0 to 18 dB.

❷ PEAKING switch
When this switch is set to ON, peaking can be adjusted using the PEAKING control ❶. When the switch is set to OFF, the PEAKING control ❶ is disabled, and the peaking value will be 0 dB.

❸ Friction adjustment knob
Used to adjust the amount of friction in the tilting mechanism.

❹ Lift-lock release knob
The viewfinder height can be adjusted while pulling this knob. By releasing the knob after adjusting the height to the standard (low), middle position, or top position, the viewfinder will remain fixed at that height.

❺ POWER switch
Turns the power supply from the camera to the viewfinder on and off.

❻ ⓘ (attention) indicator
This indicator lights when the camera detects certain conditions. The particular conditions which cause the indicator to light up are set by the camera.
For information on how to set up and verify the conditions under which the ! indicator will light, refer to the manual for the camera being used.

❼ Green tally lamps *2
Light up when the camera receives a green tally signal.

❽ BRIGHT (brightness) control *1
Used to adjust the picture brightness.

❾ Lock lever
This lever is used to lock the viewfinder into a desired angle. The angle is locked when the lever is pushed toward the camera lens. When the lever is pulled toward the back of the camera, the angle can be adjusted. The tilt mechanism will resist movement with the amount of friction set by the friction adjustment knob ❸.

❿ CONTRAST control *1
Used to adjust the picture contrast.

⓫ TALLY ON/OFF switch
Controls the external tally lamp ⓮. When set to ON, the external tally lamp will operate. When set to OFF, the lamp will not operate (will not light in response to a tally signal).

⓬ BATT (battery) indicator
This indicator blinks when the voltage output of the camera battery drops. When the battery reaches a point that it may no longer be used, the indicator will light up. To prevent camera shutdown due to the battery running down, change the battery as soon as possible after this indicator begins blinking.
The threshold battery voltage value to make this indicator begin blinking is set by the camera. For details, refer to the manual for the camera.

⓭ Red tally lamps *2
Light up when the camera receives a red tally signal.

⓮ External tally lamp
Lights up red in response to a red tally signal. Can be used to display the camera number by attaching one of the supplied number plates (0 through 9).

⓯ External tally dimmer control
Used to adjust the brightness of the external tally lamp. Use a screwdriver to turn the control clockwise to increase the brightness, or counterclockwise to dim the lamp.

⓰ CAMERA connector (D-sub 25-pin)
Used to connect to the camera's viewfinder connector.

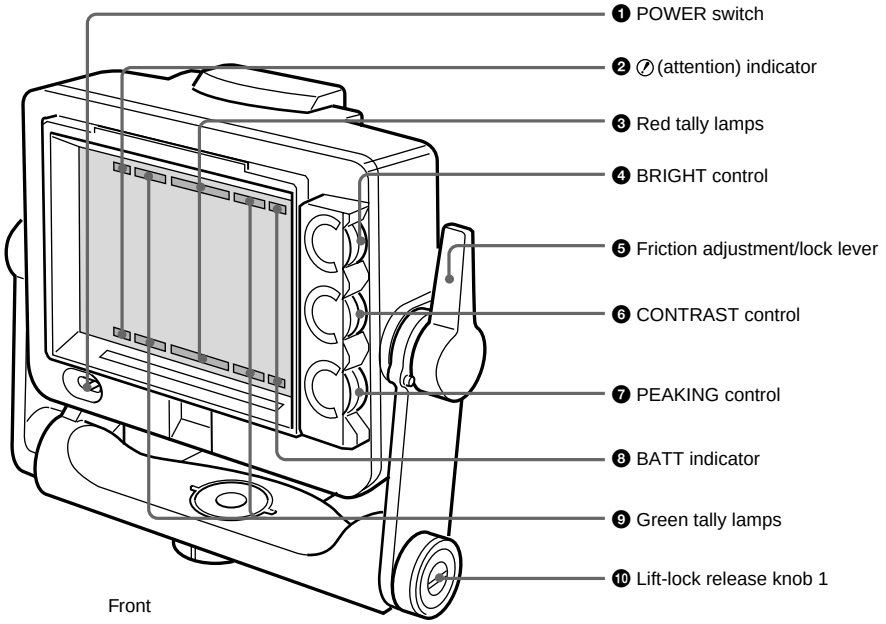
⓱ Mounting wedge
To attach the viewfinder to a camera, the mounting wedge is inserted into the V-shaped groove on the top of the camera.

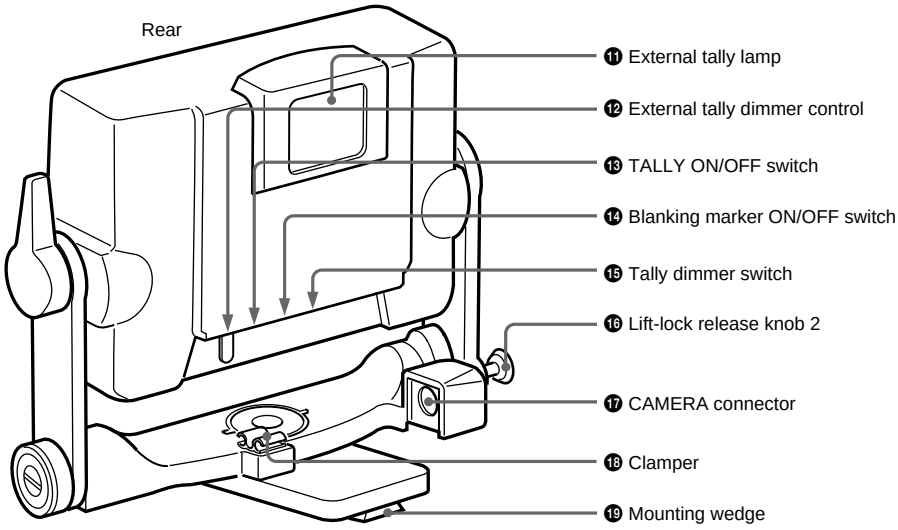
**1 These controls have no effect on the camera's video output signals.*
**2 The brightness of these lamps can be adjusted using controls inside the viewfinder body.*

7-16. HDVF-C700W/C750W, HD Electronic Viewfinder

7-16-1 *Appearance*

The figure illustrates the HDVF-C750W. The parts of the HDVF-C750W and the HDVF-C700W have basically the same functions.





❶ POWER switch
Turns the power supply from the camera to the viewfinder on and off.

❷ (attention) indicator
This indicator lights when the camera detects certain conditions. The particular conditions which cause the indicator to light up are set up by the camera.
For information on how to set up and verify the conditions under which the indicator will light, refer to the manual for the camera being used.

❸ Red tally lamps
Light up when the camera receives a red tally signal.

❹ BRIGHT (brightness) control*1
Adjusts the picture brightness.

❺ Friction adjustment/lock lever
Adjusts the amount of friction in the tilting mechanism. Also, locks the viewfinder into a desired angle. The angle is locked when the lever is pushed toward the camera lens. When the lever is pulled toward the back of the camera, the tilting mechanism can be adjusted.

❻ CONTRAST control*1
Adjusts the picture contrast.

❼ PEAKING control*1
Sharpens the edges in the picture. Turning the control clockwise increases the sharpness. The peaking can be adjusted from off to 16 dB.

❽ BATT (battery) indicator
This indicator blinks when the voltage output of the camera battery drops. When the battery reaches a point that it may no longer be used, the indicator will light up. To prevent camera shut down due to the battery running down, change the battery as soon as possible after this indicator begins blinking.
The threshold battery voltage value to make this indicator begin blinking is set by the camera. For details, refer to the manual for the camera.

❾ Green tally lamps
Light up when the camera receives a green tally signal.

❿ Lift-lock release knob 1 (HDVF-C750W only)
Adjust the viewfinder height using lift-lock release knob 2 ⓰ together with this knob.

⓫ External tally lamp
Lights up red in response to a red tally signal. Can be used to display the camera number by attaching one of the supplied number plates (0 through 9).

⓬ External tally dimmer control
Adjusts the brightness of the external tally lamp. Use a screwdriver to turn the control counterclockwise to increase the brightness, or clockwise to dim the lamp.

⓭ TALLY ON/OFF switch
Controls the external tally lamp ⓫. When set to ON, the external tally lamp will operate. When set to OFF, the lamp will not operate (will not light in response to a tally signal).

⓮ Blanking marker ON/OFF switch
Turns the display of the blanking marker on and off.

⓯ Tally dimmer switch
Adjusts the brightness of the red tally lamps ❸, the green tally lamps ❾, the (attention) indicator ❷, and the BATT (battery) indicator ❽ on the front panel.

⓰ Lift-lock release knob 2 (HDVF-C750W only)
Adjust the viewfinder height using lift-lock release knob 1 ❿ together with this knob.

⓱ CAMERA connector (HDVF-C750W: Round type 20-pin, HDVF-C700W: D-sub 25-pin)
HDVF-C750W: Connect to the camera's viewfinder connector using the supplied connecting cable.
HDVF-C700W: The CAMERA connector is on the bottom of the viewfinder. Connect to the camera's viewfinder connector.

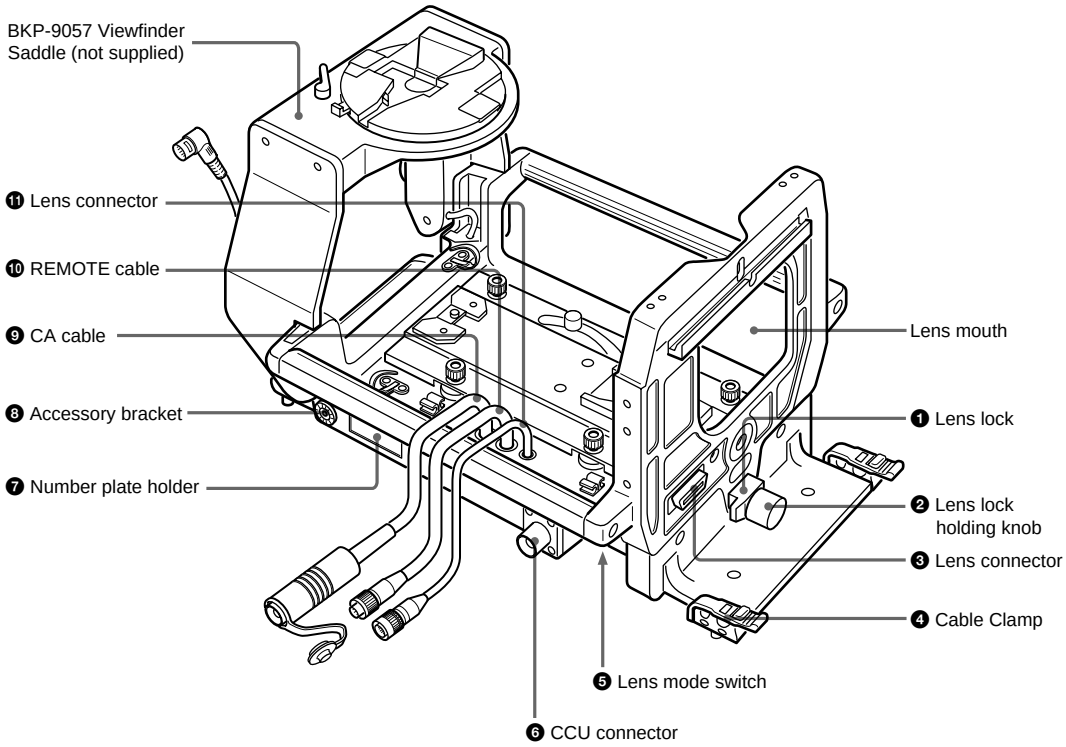
⓲ Clamper (HDVF-C750W only)
Clamps the supplied connecting cable.

⓳ Mounting wedge
To attach the viewfinder to a camera, the mounting wedge is inserted into the V-shaped groove on the top of the camera.

**1 These controls have no effect on the camera's video output signals.*

7-17. CA-905L, Large Lens Adaptor

7-17-1 *Lens Attachment Section (Front) and Connectors*



❶ Lens lock
Secures the lens by the tongue-like protrusion at the lens bottom.

❷ Lens lock holding knob
Secures the lens lock. Turn clockwise to tighten, and counterclockwise to loosen.

❸ Lens connector (36-pin)
Connect to the connector on the lens.

❹ Cable clamp
Secures the camera cable. The diameter of the cable with a diameter of 8 to 15 mm should be used with the cable clamp.

❺ Lens mode switch
Selects one of the two lens communication modes. During normal operation, set to NORMAL. During use of a serial communication lens, set to SERIAL.

❻ CCU (camera control unit) fiber connector: LEMO type
Connects through an optional fiber cable to the CAMERA connector on the CCU.

❼ Number plate holder
Fit the supplied number plates.

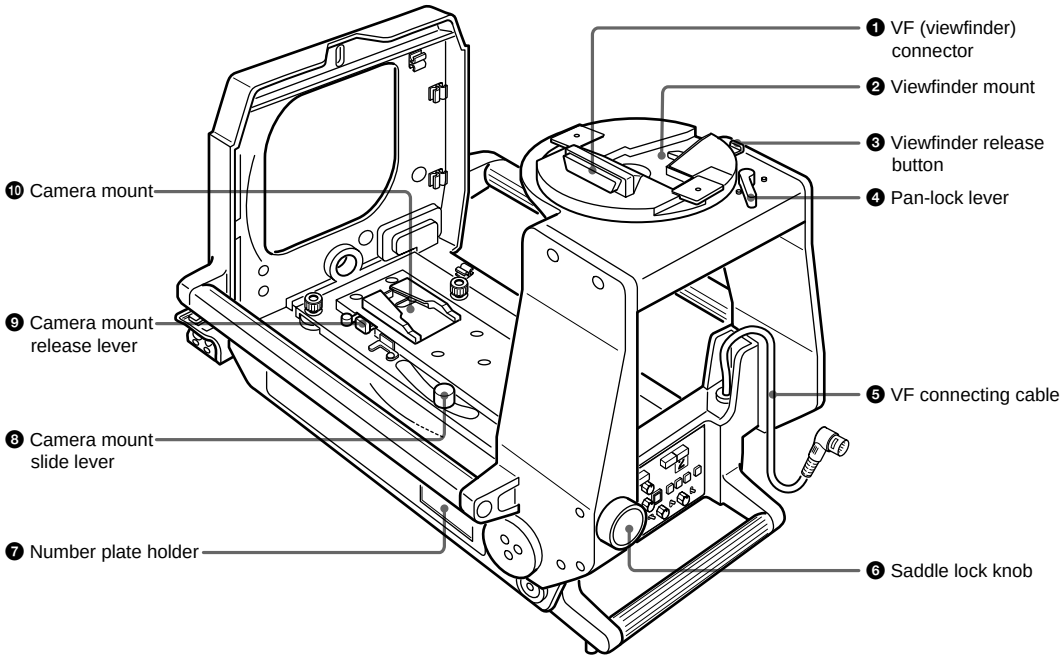
❽ Accessory bracket
Attach an optional accessory, such as a BKP-7911/7912 Script Holder.

❾ CA (camera adaptor) cable (fiber connector): LEMO type
Connect to the CCU connector on the camera adaptor.

❿ REMOTE cable (8-pin)
Connect to the REMOTE connector on the camera adaptor.

⓫ Lens connector (12-pin)
Connect to the LENS connector of the camera.

7-17-2 *Camera-mounting Section (Inner Base) and the Optional BKP-9057 Viewfinder Saddle*



❶ VF (viewfinder) connector
Connect to the camera connector on a viewfinder.

❷ Viewfinder mount
Attach the viewfinder.

❸ Viewfinder release button
Push this button to disengage the viewfinder

❹ Pan-lock lever
Turn counterclockwise to tighten the viewfinder. Turn clockwise to loosen the viewfinder.

❺ VF connecting cable (supplied with the BKP-9057) (20-pin)
Connects to the VF connector (20-pin) on the camera.

❻ Saddle lock knob
Locks the saddle so it does not topple down. Turn counterclockwise to tighten the saddle, or clockwise to loosen it.

❼ Number plate holder
Fit the supplied number plates.

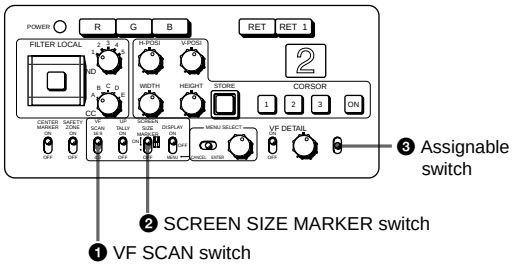
❽ Camera mount slide lever
Pull this lever to slide the camera mount forward and backward.

❾ Camera mount release lever
To remove the camera from the unit, push this lever while pushing the safety lever (on the left) rightward.

❿ Camera mount
Fit the camera. Slide to the front and rear.

7-17-3 *Rear control panel*

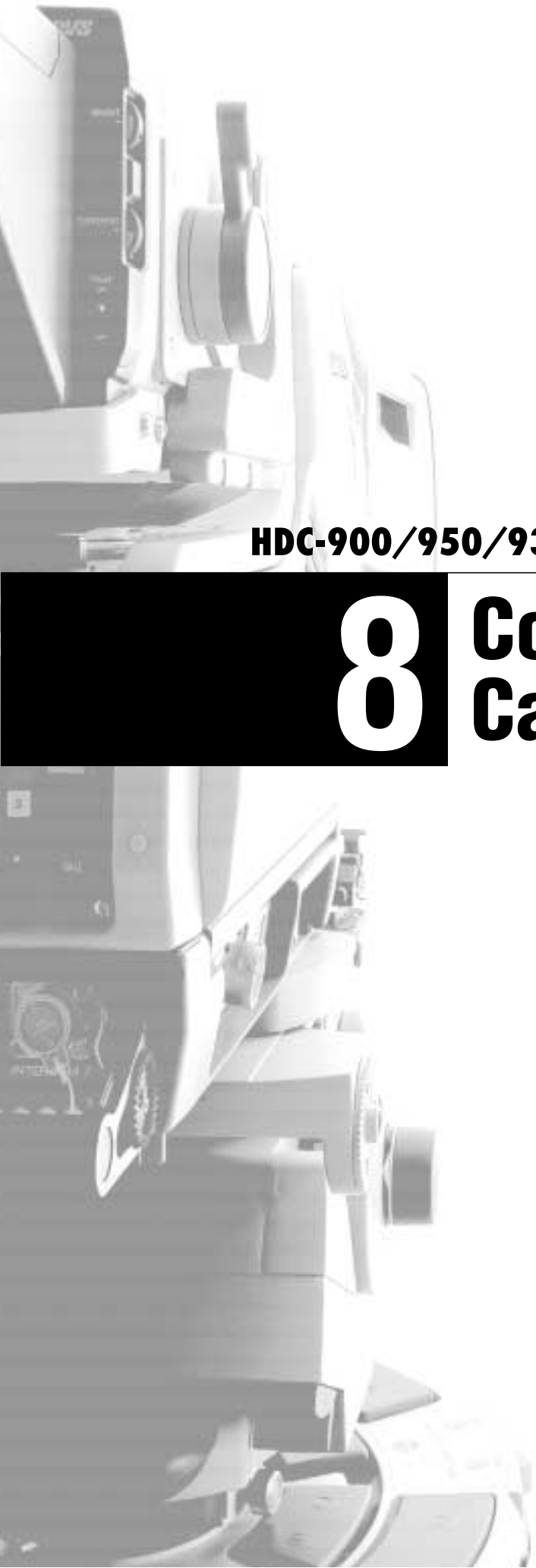
CA-905L (during use with the HDC-950/930 only) with rear-panel sticker attached



❶ VF SCAN (viewfinder scan) switch
Selects the aspect ratio of the viewfinder screen.
16:9: 16:9 aspect ratio
4:3: 4:3 aspect ratio

❷ SCREEN SIZE MARKER switch
Selects the screen size marker on the viewfinder screen.
ON (▮▮): Display area is bounded by two dark margins.
ON(▯▯): Display area is bounded by two white lines.
OFF: No marker is displayed.

❸ Assignable switch
A function specified by menu setting on the HDC-950/930 can be assigned to this switch.

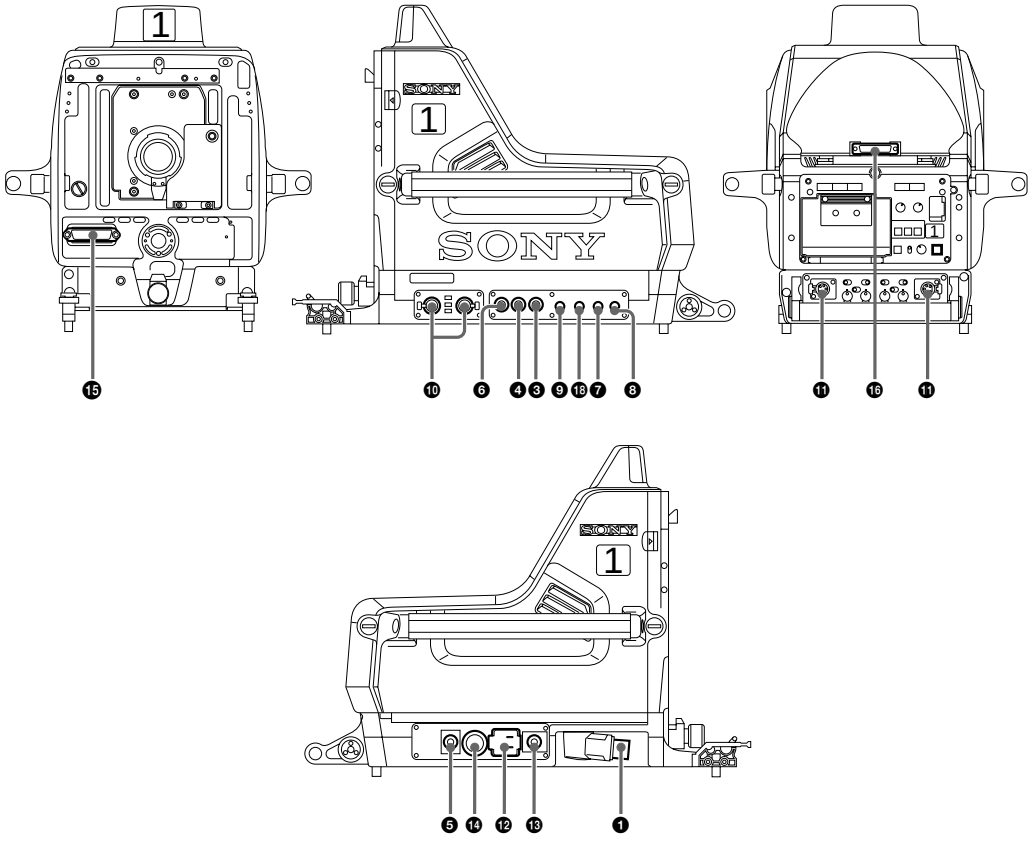


8 Connectors and Cables

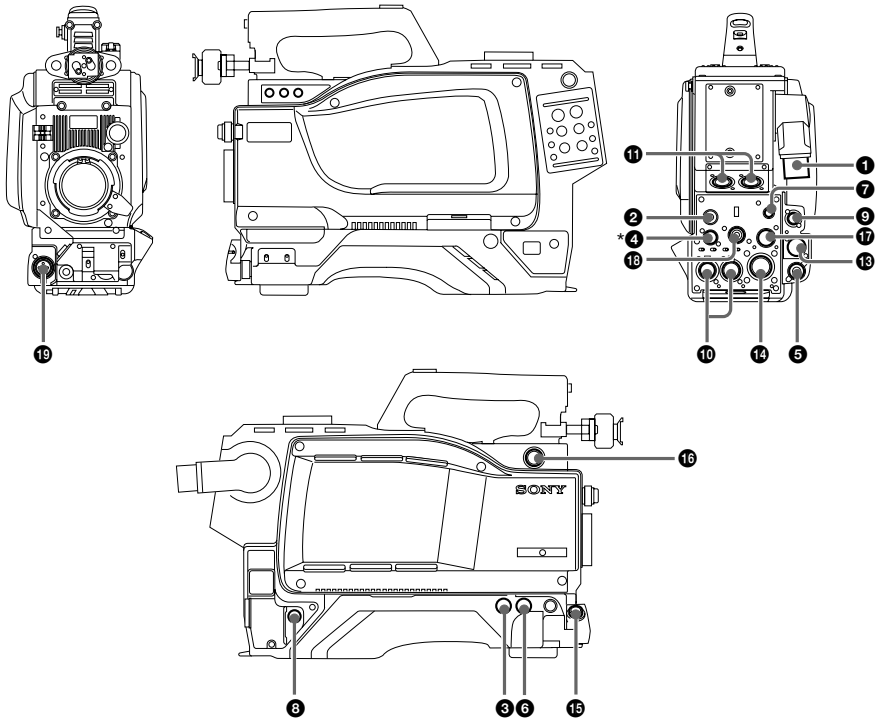
8-1. HDC-900/950/930 and HKC-T950, HD Color Video Camera and HD CCD Black Adaptor

8-1-1 *Connector Input/Output Signals*

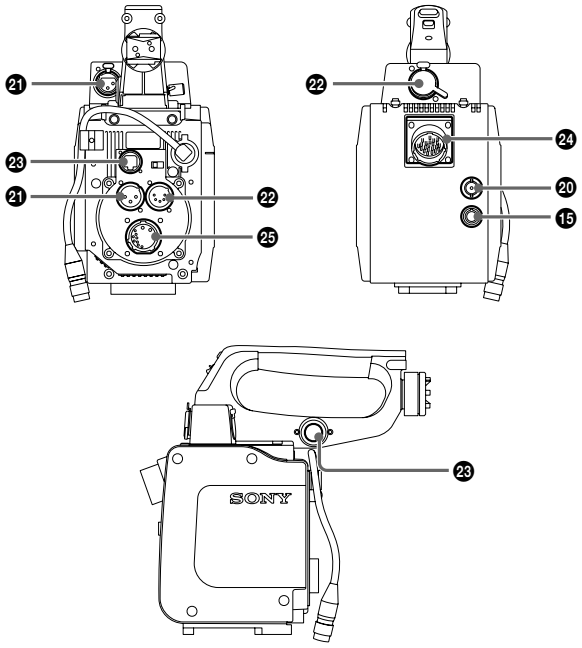
HDC-900 Connector Layout



HDC-950/930 Connector Layout



HKC-T950 Connector Layout



Input/Output Signals

❶ CCU connector
Based upon BTA S-004A/005A/006A 1.485 Gbps serial

Output Signals

❷ EARPHONE OUT (HDC-950/930)
EARPHONE mini jack

❸ TEST OUT
BNC type 75 Ohms, 1.0 V p-p

❹ PROMPTER OUT *
BNC type 75 Ohms, 1.0 V p-p

❺ HD SERIAL DIGITAL OUT
Based upon BTA-S004A
BNC type 75 Ohms, 0.8 V p-p 1.485 Gbps

⓴ VIDEO OUT (HKC-T950)
BNC type 75 Ohms, 1.0 V p-p

Input Signals

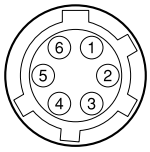
❹ GENLOCK IN* (HDC-950/930)
BNC type 75 Ohms, 1.0 V p-p

❹ RET IN* (HDC-950/930)
BNC type 75 Ohms, 1.0 V p-p

❻ Not used

** Use this connector by selecting PROMPTER OUT, GENLOCK IN and RET IN signals with the switch on the rear panel of the HDC-950/930.*
PROMPTER OUT signal becomes effective when the camera is connected to the CCU.
GENLOCK IN and RET IN signals become effective when the camera is used alone.

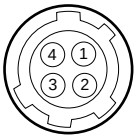
❼ RET CONTROL (6P FEMALE)



(External view)

No.	Signal	I/O	Specifications
1	INCOM 1 MIC ON/OFF	IN	Zi ≥ 10 kOhms ON : GND OFF : OPEN
2	INCOM 2 MIC ON/OFF	IN	Zi ≥ 10 kOhms ON : GND OFF: OPEN
3	GND	—	
4	NC	—	No connection
5	RET 1 ON/OFF	IN	Zi ≥ 10 kOhms ON : GND OFF : OPEN
6	RET 2 ON/OFF	IN	Zi ≥ 10 kOhms ON : GND OFF : OPEN

❽ DC OUT (4P FEMALE)

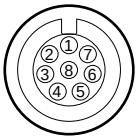


(External view)

No.	Signal	I/O	Specifications
1	GND	—	GND for POWER
2	NC		No connection

No.	Signal	I/O	Specifications
3	NC		No connection
4	UNREG	OUT	+12 V dc 500 mA

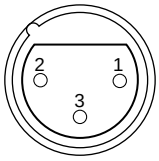
❾ REMOTE (8P FEMALE)



(External view)

No	Signal	I/O	Specifications
1	TX (+)		HDC SERIAL DATA
2	TX (–)		
3	RX (+)		HDCU/MSU/RCP/ CNU/VCS SERIAL DATA
4	RX(-)		
5	TX GND	—	GND for TX
6	POWER (+)	OUT	+26 V, 200 mA (max)
7	POWER GND	—	GND for POWER (+)
8	VIDEO (X)		75 Ohms, 1.0 V p-p
	CHASSIS GND	—	CHASSIS GND

❿ AUDIO IN CH1/CH2 (3P FEMALE)

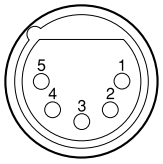


(External view)

No	Signal	I/O	Specifications
1	AUDIO (G)	—	–60 dBu, –50 dBu, –40 dBu, -30 dBu, –20 dBu, selectable High impedance, Balanced
2	AUDIO (X)	IN	
3	AUDIO (Y)	IN	

(0 dBu = 0.775 Vrms)

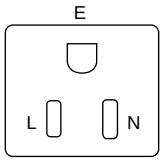
⓫ INTERCOM CH1/CH2 (5P FEMALE)



(External view)

No.	Signal	I/O	Specifications
1	INCOM MIC (Y)	IN	–20 dBu (CARBON MIC) –60 dBu (DYNAMIC MIC)
2	INCOM MIC (X)	IN	
3	GND (INCOM/ PGM)	—	
4	INCOM RECEIVE	OUT	0 dBu
5	PGM	OUT	0 dBu

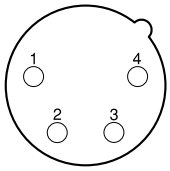
⓬ AC OUT (HDC-900))



(External view)

No.	Signal	I/O	Specifications
E	GND	—	CHASSIS GND
N	UTL (C)	OUT	AC 100 V, 200 V or below
L	UTL (H)	OUT	

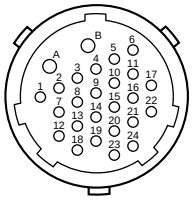
⓭ DC IN (4P MALE)



(External view)

No	Signal	I/O	Specifications
1	GND	—	GND for DC (+)
2	NC		No connection
3	NC		No connection
4	DC (+)	IN	+10.5 to 17 V dc

⓮ VTR (26P MALE) (HDC-900)



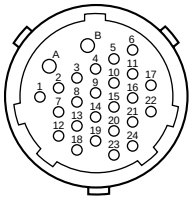
(External view)

No	Signal	I/O	Specifications
A	NC		No connection
B	VTR CMD GND	—	GND for VTR CMD
1	GENLOCK	IN	Sync 0.6 V p-p, 0 V dc, Zi = 75 Ohms
2	GENLOCK GND	—	GND for GENLOCK
3	G/Y GND	—	GND for G/Y
4	DC (+)	IN	1 Vp-p, 0 V dc, Zo = 75 Ohms
5	R/P_R	OUT	1 Vp-p/±0.35 V p-p, 0 V dc, Zo = 75 Ohms
6	R/P_R GND	—	GND for R/P_R
7	B/P_B	OUT	1 Vp-p/±0.35 V p-p, 0 V dc, Zo = 75 Ohms
8	B/P_B GND	—	GND for B/P_B
9	CH1 MIC (X)	OUT	–20 dBu, Low impedance, Balanced
10	CH1 MIC (Y)	OUT	
11	CH1/CH2 MIC GND	—	GND for CH1/CH2 MIC

No	Signal	I/O	Specifications
12	NC		No connection
13	NC		No connection
14	INCOM LINE	IN/ OUT	0.5 V p-p
15	CH2 MIC (X)	OUT	–20 dBu, Low impedance Balanced
16	CH2 MIC (Y)	OUT	
17	NC		No connection
18	RET VIDEO	IN	1.0 V p-p, 0 V dc, Zi = 75 Ohms
19	RET VIDEO GND	—	GND for RET VIDEO
20	AUDIO	IN	–6 dBu, 750 Ohms/ 1 kHz
21	RX COMMAND (X)	IN	RS-422
22	RX COMMAND (X)	IN	
23	TX COMMAND (X)	OUT	RS-422
24	TX COMMAND (Y)	OUT	

(0 dBu = 0.775 Vrms)

⓮ VTR (26P MALE) (HDC-950/930)

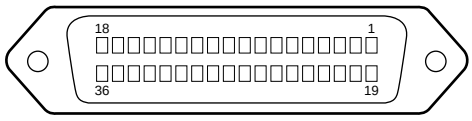


(External view)

No	Signal	I/O	Specifications
A	VTR UNREG	IN	+10.5 to 17 V dc
B	UNREG GND	—	GND for UNREG
1	GENLOCK	IN	Sync 0.6 V p-p, 0 V dc, Zi = 75 Ohms
2	GENLOCK GND	—	GND for GENLOCK
3	G/Y GND	—	GND for G/Y
4	G/Y	OUT	1 Vp-p, 0 V dc, Zo = 75 Ohms
5	R/P_R	OUT	1 Vp-p/±0.35 V p-p, 0 V dc, Zo = 75 Ohms
6	R/P_R GND	—	GND for R/P_R
7	B/P_B	OUT	1 Vp-p/±0.35 V p-p, 0 V dc, Zo = 75 Ohms
8	B/P_B GND	-	GND for B/P_B
9	CH1 MIC (X)	OUT	–20 dBu, Low impedance, Balanced
10	CH1 MIC (Y)	OUT	
11	CH1/CH2 MIC GND	—	GND for CH1/CH2 MIC
12	UNREG (+) SENSE IN		
13	UNREG (–) SENSE IN		
14	INCOM LINE	IN/ OUT	0.5 V p-p
15	CH2 MIC (X)	OUT	–20 dBu, Low impedance Balanced
16	CH2 MIC (Y)	OUT	
17	NC		No connection
18	RET VIDEO	IN	1.0 V p-p, 0 V dc, Zi = 75 Ohms
19	RET VIDEO GND	—	GND for RET VIDEO
20	AUDIO	IN	–6 dBu, 750 Ohms/ 1 kHz
21	RX COMMAND (X)	IN	RS-422
22	RX COMMAND (Y)	IN	
23	TX COMMAND (X)	OUT	RS-422
24	TX COMMAND (Y)	OUT	

(0 dBu = 0.775 Vrms)

⓯ LENS (36P FEMALE) (HDC-900))



(External view)

No	Signal	I/O	Specifications
1	NC		No connection
2	COMMON 5 V	IN	No connection
3	NC		No connection
4	+12 V (LENS)	OUT	+12 V (at 2 A)
5	LENS DC GND	—	GND for +12 V (LENS)
6	GND (SIG)	—	GND
7	NC		No connection
8	LENS EXT-1	IN	*2
9	LENS EXT-2	IN	*2
10	LENS EXT-3	IN	*2
11	NC LENS AUX	OUT	ON : GND OFF : High impedance
12	IRIS POSI	IN	Zi ≥ 10 kOhms 2 to 7 V “3.4 ± 0.1 V (F16)” “6.2 ± 0.1 V (F2.8)”
13	ZOOM POSI	IN	Zi ≥ 10 kOhms 2 to 7 V “2 V (WIDE), 7 V (TELE)”
14	RET 1 ON	IN	Zi ≥ 10 kOhms ON : GND OFF : High impedance
15	RET 2 ON	IN	Zi ≥ 10 kOhms ON : GND OFF : High impedance
16	FOCUS POSI	IN	Zi ≥ 10 kOhms 2 to 7 V “2 V (MIN), 7 V (∞)”
17	IRIS CONT SIG	OUT	2 to 7 V, “3.4 ± 0.1 V (F16)” “6.2 ± 0.1 V (F2.8)” Zo ≤1 kOhms
18	IRIS AUTO/ MANU	OUT	AUTO : GND MANU : High impedance Zo ≤1 kOhms
19	NC		No connection
20	NC		No connection
21	LENS R TALLY	OUT	ON : GND OFF : High impedance Zo ≤1 kOhms

No	Signal	I/O	Specifications
22	EXP POSI-TION	IN	Zi ≥ 10 kOhms 1 to 4 V 1 V : –7.5° 4 V : +7.5°
23	RET 3 ON	IN	Zi ≥ 10 kOhms ON : GND OFF : High impedance
24	LENS ADRS 0	IN	*1
25	LENS ADRS 1	IN	*1
26	LENS ADRS 2	IN	*1
27	LENS ADRS 3	IN	*1
28	EXTENDER 1 ON	OUT	ON : GND OFF : High impedance
29	EXTENDER 2 ON	OUT	ON : GND OFF : High impedance
30	F DEM (FAR)	IN	No connection
31	INCOM 1 ENG/PRD	IN	Zi ≥ 10 kOhms ENG : GND PRD : High impedance
32	INCOM 2 ENG/PROD	IN	Zi ≥ 10 kOhms ENG : GND PRD : High impedance
33	INCOM MIC 1 ON	IN	Zi ≥ 10 kOhms ON : GND OFF : High impedance
34	INCOM MIC 2 ON	IN	Zi ≥ 10 kOhms ON : GND OFF : High impedance
35	F CONT SIG	OUT	No connection
36	F DEM (NEAR)	IN	No connection

*1:
Zi ≥ 10 kOhms
1 : High impedance
0 : 0 +0.5 V –0
LENS ADRS 0 (low-order bit)
LENS ADRS 3 (high-order bit)

*2:
Zi > 10 kOhms
1 : High impedance
0 : 0 ±0.5 V

EX1	EX2	EX3	MODE
1	1	1	EXTENDER OFF
0	0	1	EXT-1 (x 1.5) ON
0	1	1	EXT-2 (x 2) ON
0	0	1	EXT-3 (x 2.5) ON

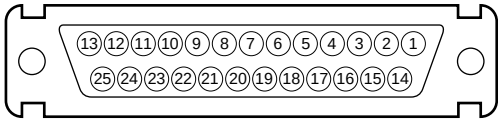
⓯ LENS (12P FEMALE) (HDC-950/930, HKC-T950))



(External view)

No	Signal	I/O	Specifications
1	RET VIDEO ENABLE	IN	ENABLE : 0 V DISABLE : +5 V or OPEN
2	VTR START /STOP	IN	ENABLE : 0 V DISABLE : +5 V or OPEN
3	GND	—	GND for UNREG
4	AUTO SERVO	OUT	AUTO : +5 V MANU : 0 V or OPEN
5	IRIS CONT	OUT	+3.4 V (F16) to +6.2 V (F2.8)
6	UNREG	OUT	+10.5 V to +17 V
7	IRIS POSITION	IN	+3.4 V (F16) to +6.2 V (F2.8)
8	AUTO/MANU	OUT	AUTO IRIS : 0 V MANUAL IRIS : +5 V
9	EXTENDER ON/OFF	IN	EX 2 ON : 0 V EX 0.8 ON : +1.8 V OFF : +4.8 V
10	ZOOM POSITION	IN	WIDE : 2 V TELE : 7 V
11	FOCUS POSI (/LENS RX)	IN	∞: 7 V min. : 2 V
12	(LENS TX)	OUT	

⓰ VF (25P FEMALE) (HDC-900)

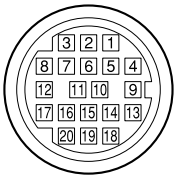


(External view)

No	Signal	I/O	Specifications
1	Y VIDEO (X)	OUT	1.0 V p-p, Zo = 75 Ohms
2	PR VIDEO GND	—	GND for PR VIDEO
3	PR VIDEO (X)	OUT	0.7 V p-p, Zo = 75 Ohms
4	PB VIDEO GND	—	GND for PB VIDEO
5	PB VIDEO (X)	OUT	0.7 V p-p, Zo = 75 Ohms
6	PEAKING LEVEL	IN	0 to 5 V dc
7	+12 V	OUT	+10.5 to +20 V
8	+12 V	OUT	+10.5 to +20 V
9	NC		No connection
10	S-DATA	IN/ OUT	TTL level
11	R TALLY	OUT	ON : +5 V OFF : 0 V
12	EFFECT	OUT	ON : +5 V OFF : 0 V
13	NC		No connection
14	Y VIDEO GND	—	GND for Y VIDEO
15	S-CK	OUT	TTL level
16	BATT IND	OUT	ON : +5 V OFF : 0 V
17	CHASSIS GND	—	
18	G TALLY	OUT	ON : +5 V OFF : 0 V
19	GND (+12 V)	—	GND for +12 V
20	GND (+12 V)	—	GND for +12 V
21	VF-SEL	IN	BW : 0 V COLOR : +5 V

No	Signal	I/O	Specifications
22	H EXPAND	OUT	ON : GND OFF : +5 V
23	NC		No connection
24	NC		No connection
25	V EXPAND	OUT	ON : GND OFF : +5 V

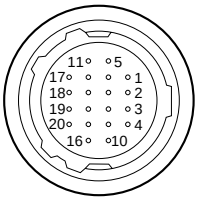
⑰ VF (20P FEMALE) (HDC-950/930)



(External view)

No	Signal	I/O	Specifications
1	S-DA TA	IN/ OUT	TTL level
2	NC		No connection
3	NC		No connection
4	SCK	OUT	TTL level
5	NC		No connection
6	NC		No connection
7	NC		No connection
8	G TALLY	OUT	ON : 5 V OFF : GND
9	NC		No connection
10	NC		No connection
11	NC		No connection
12	Y VIDEO	OUT	1.0 V p-p, Zo = 75 Ohms
13	VIDEO GND	—	GND for VIDEO
14	Pb VIDEO	OUT	±0.35 V p-p, Zo = 75 Ohms
15	Pr VIDEO	OUT	±0.35 V p-p, Zo = 75 Ohms
16	NC		No connection
17	R TALLY	OUT	ON : 5 V OFF : GND
18	NC		No connection
19	UNREG GND	—	GND for UNREG
20	UNREG	OUT	+10.5 V to +17 V

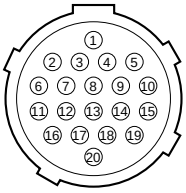
⑱ EXT I/O (20P) (HDC-950/930)



(External view)

No	Signal	I/O	Specifications
1	Y VIDEO (X)	OUT	1.0 V p-p, Zo = 75 Ohms
2	Y VIDEO (G)	—	GND for Y VIDEO
3	PROMPTER (X)	OUT	1.0 V p-p, Zo = 75 Ohms
4	PROMPTER (G)	—	GND for PROMPTER
5	Pr VIDEO (X)	OUT	±0.35 V p-p, Zo = 75 Ohms
6	Pr VIDEO (G)	—	GND for Pr VIDEO
7	Pb VIDEO (X)	OUT	±0.35 V p-p, Zo = 75 Ohms
8	Pb VIDEO (G)	—	GND for Pb VIDEO
9	SDA VF	IN/ OUT	TTL level
10	VD	OUT	Negative Pulse 3.0 V p-p, Low impedance
11	CALL ON	IN	ON : L (0 v) OFF : H (+3 V)
12	VF POWER OFF	OUT	ON : H (+5 V) OFF : L (0 V)
13	MAIN POWER ON/OFF	OUT	ON : +8 V OFF : GND
14	SCL VF	OUT	TTL level
15	TALLY GND	—	GND for TALLY
16	BACK TALLY	OUT	ON : 5 V OFF : GND
17	PANEL DATA	IN	RX SERIAL DATA
18	PANEL DATA	OUT	TX SERIAL DATA
19	VF UNREG +	—	+12 V (+10.5 V to +17.0 V)
20	GND	—	GND for UNREG

⑱ TRACKER (FEMALE)



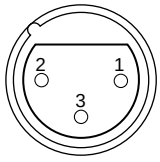
(External view)

No	Signal	I/O	Specifications
1	TRK R (X)	OUT	TRACKER RECEIVE 0 dBu unbalanced
2	TRK R (G)	—	GND for TRACKER R
3	GND (UNREG/TALLY)	—	GND for UNREG/ TALLY
4	R TALLY	OUT	ON : 5 V (Open Collector) OFF : 0 V (Open Collector)
5	TRK PGM (G)	—	GND for PGM
6	UNREG	OUT	+12 V (+10.5 to +17.0 V)
7	TRK T (X)	IN	TRACKER TALK 0 dBu /_20 dBu High impedance balanced
8	TRK T (Y)	IN	TRACKER TALK 0 dBu /_20 dBu High impedance balanced
9	TRK T (G)	—	GND for TRACKER T

No	Signal	I/O	Specifications
10	TRK PGM (X)	OUT	–20 dBu unbalanced
11	NC		No connection
12	G TALLY	OUT	ON : 5 V (Open Collector) OFF : 0 V (Open Collector)
13	NC		No connection
14	RX_DATA (0)	IN	TRUNK DATA IN, RS232-C
15	RX_DATA (1)	IN	TRUNK DATA IN, RS232-C
16	NC		No connection
17	NC		No connection
18	TX_DATA (0)	OUT	TRUNK DATA OUT, RS232-C
19	TX_DATA (1)	OUT	TRUNK DATA OUT, RS232-C
20	GND	—	

(0 dBu = 0.775 Vrms)

⓳ FRONT MIC (3P FEMALE) (HDC-950/930)



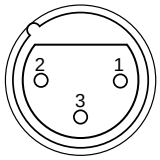
(External view)

No	Signal	I/O	Specifications
1	CHU MIC (G)	—	–60 dBu, –50 dBu, –40 dBu
2	CHU MIC (X)	IN	–30 dBu, –20 dBu, selectable
3	CHU MIC (Y)	IN	High impedance, Balanced

(0 dBu = 0.775 Vrms)

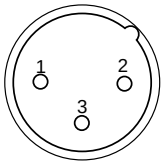
㉑ MIC (HKC-T950)

(3P FEMALE)



(External view)

(3P MALE)



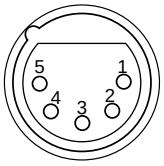
(External view)

No	Signal	I/O	Specifications
1	AUDIO (G)	—	–60 dBu, –50 dBu, –40 dBu
2	AUDIO (X)	IN	–30 dBu, –20 dBu, selectable
3	AUDIO (Y)	IN	High impedance, Balanced

(0 dBu = 0.775 Vrms)

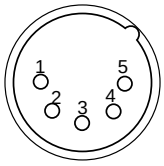
㉒ INCOM (HKC-T950)

(5P FEMALE)



(External view)

(5P MALE)



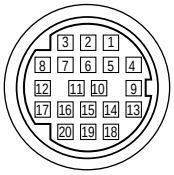
(External view)

No	Signal	I/O	Specifications
1	INCOM MIC (Y)	IN	–20 dBu (CARBON MIC)
2	INCOM MIC (X)	IN	–60 dBu (DYNAMIC MIC)
3	GND (INCOM/PGM)	—	
4	INCOM RECEIVE	OUT	0 dBu
5	PGM	OUT	0 dBu

(0 dBu = 0.775 Vrms)

㉓ HKC-T950

(20P FEMALE)



(External view)

No	Signal	I/O	Specifications
1	S DATA	IN/OUT	TTL level
2	NC		No connection
3	NC		No connection
4	SCK	OUT	TTL level MANU : 0 V or OPEN
5	NC		No connection
6	NC		No connection
7	NC		No connection
8	G TALLY	OUT	ON : 5 V OFF : GND
9	NC		No connection
10	NC		No connection
11	NC		No connection
12	Y VIDEO	OUT	1.0 V p-p, Zo = 75 Ohms
13	VIDEO GND	—	GND for VIDEO
14	NC		No connection
15	NC		No connection
16	NC		No connection
17	R TALLY	OUT	ON : 5 V OFF : GND
18	NC		No connection
19	UNREG GND	—	GND for UNREG
20	UNREG	OUT	+10.5 V to +17 V

(20P FEMALE)

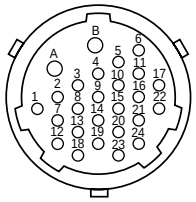


(External view)

No	Signal	I/O	Specifications
1	S DATA	IN/ OUT	TTL level
2	NC		No connection
3	NC		No connection
4	SCK	IN	TTL level MANU : 0 V or OPEN
5	NC		No connection
6	NC		No connection
7	NC		No connection
8	G TALLY	IN	ON : 5 V OFF : GND
9	NC		No connection
10	NC		No connection
11	NC		No connection
12	Y VIDEO	IN	1.0 V p-p, Zo = 75 Ohms
13	VIDEO GND	—	GND for VIDEO
14	NC		No connection
15	NC		No connection
16	NC		No connection
17	R TALLY	IN	ON : 5 V OFF : GND
18	NC		No connection
19	NC		No connection
20	NC		No connection

㉔ CAM BODY (HKC-T950)

(26P MALE)

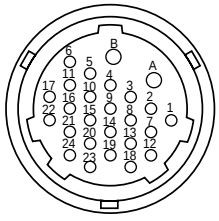


(External view)

No	Signal	I/O	Specifications
A	UNREG	IN	13 V to 17 V
B	UNREG GND	—	GND for UNREG
1	OHB H	OUT	0.3 V p-p Positive pulse
2	OHB H (G)	—	GND for OHB H
3	G VIDEO (G)	—	GND for G VIDEO
4	G VIDEO (X)	OUT	300 mV p-p, Zo = 75 Ohms(100 %)
5	R VIDEO (X)	OUT	300 mV p-p, Zo = 75 Ohms (100 %)
6	R VIDEO (G)	—	GND for R VIDEO
7	B VIDEO (X)	OUT	95 mV p-p, Zo = 75 Ohms (100 %)
8	B VIDEO (G)	—	GND for B VIDEO
9	MIC (X)	OUT	–60 dBu, –50 dBu, –40 dBu,
10	MIC (Y)	OUT	–30 dBu, –20 dBu, selectable
11	INCOM/MIC GND	—	GND for INCOM/ MIC, CHU F, IRIS CONT
12	IRIS CONT	IN	+3.4 V (F16) to +6.2 V (F2.8)
13	CHU F	IN	0.3 V p-p Positive pulse
14	INCOM RECEIVE	IN	0 dBu
15	INCOM MIC (X)	OUT	–20 dBu (CAR-BON MIC)
16	INCOM MIC (Y)	OUT	–60 dBu (DYNAMIC MIC)
17	CHU H	IN	150 mV p-p Posi-tive pulse
18	VF VIDEO (X)	IN	180 mV p-p, Zi = 75 Ohms
19	VF VIDEO (G)	—	GND for VF VIDEO,CHU H
20	PGM	IN	0 dBu
21	RX COMMAND (X)	IN	340 mV p-p
22	RX COMMAND (Y)	IN	340 mV p-p
23	TX COMMAND (X)	OUT	340 mV p-p
24	TX COMMAND (Y)	OUT	340 mV p-p

㉕ OPT HEAD (HKC-T950)

(26P FEMALE)



(External view)

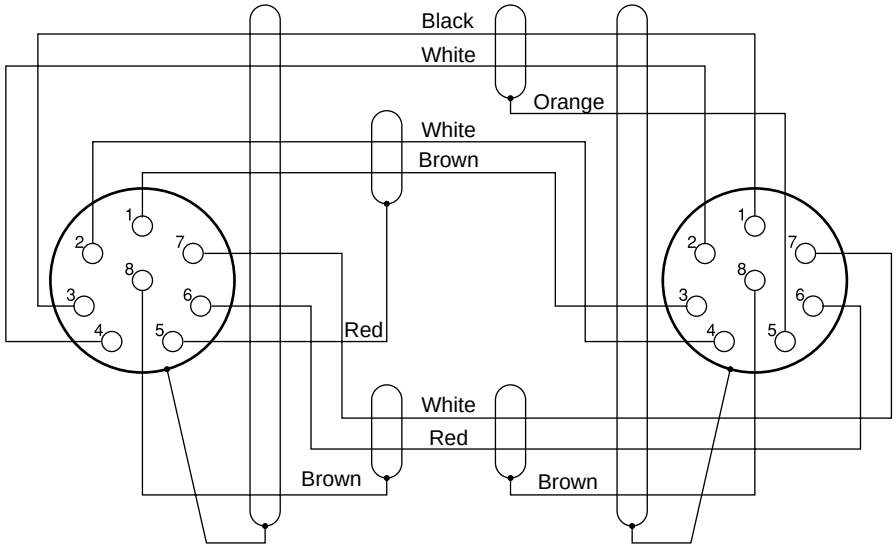
No	Signal	I/O	Specifications
A	UNREG	OUT	13 V to 17 V
B	UNREG GND	—	GND for UNREG
1	OHB H	IN	0.3 V p-p Positive pulse
2	OHB H (G)	—	GND for OHB H
3	G VIDEO (G)	—	GND for G VIDEO
4	G VIDEO (X)	IN	300 mV p-p, Zo = 75 Ohms(100 %)
5	R VIDEO (X)	IN	300 mV p-p, Zo = 75 Ohms (100 %)
6	R VIDEO (G)	—	GND for R VIDEO
7	B VIDEO (X)	IN	95 mV p-p, Zo = 75 Ohms (100 %)
8	B VIDEO (G)	—	GND for B VIDEO
9	MIC (X)	IN	–60 dBu, –50 dBu, –40 dBu,
10	MIC (Y)	IN	–30 dBu, -20 dBu, selectable
11	INCOM/MIC GND	—	GND for INCOM/ MIC, CHU F, IRIS CONT

No	Signal	I/O	Specifications
12	IRIS CONT	OUT	+3.4 V (F16) to +6.2 V (F2.8)
13	CHU F	OUT	0.3 V p-p Positive pulse
14	INCOM RECEIVE	OUT	0 dBu
15	INCOM MIC (X)	IN	–20 dBu (CARBON MIC)
16	INCOM MIC (Y)	IN	–60 dBu (DYNAMIC MIC)
17	CHU H	OUT	150 mV p-p Positive pulse

No	Signal	I/O	Specifications
18	VF VIDEO (X)	OUT	180 mV p-p, Zi = 75 Ohms
19	VF VIDEO (G)	—	GND for VF VIDEO,CHU H
20	PGM	OUT	0 dBu
21	RX COMMAND (X)	OUT	340 mV p-p
22	RX COMMAND (Y)	OUT	340 mV p-p
23	TX COMMAND (X)	IN	340 mV p-p
24	TX COMMAND (Y)	IN	340 mV p-p

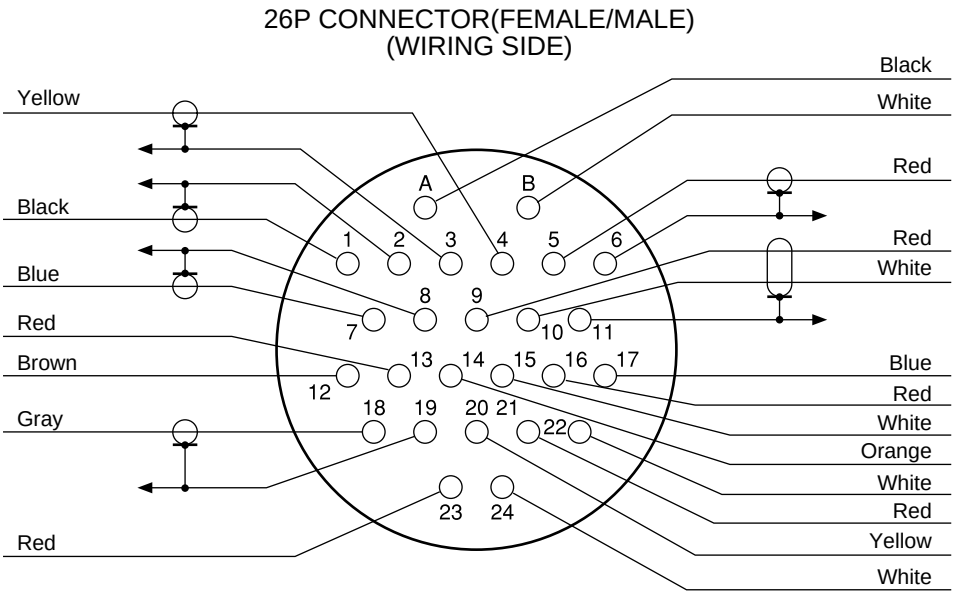
8-1-2 *Wiring Diagrams for Cables*

CCA-5 Cable



8-pin connector (Male)
(Wiring side)

8-pin connector (Male)
(Wiring side)



8-1-3 *Connection Connectors/Cables*

Connections made with the connector panels during installation or service should be made with the connectors/complete cable assemblies specified in the following list, or equivalent parts.

Indication	Connection connector/cable
MONITOR PROMPTER SERIAL OUT VIDEO OUT (BNC)	1-569-370-12 Plug, BNC
AUDIO IN MIC IN (3P FEMALE)	1-508-084-00 XLR, 3P Male or ITT Cannon XLR-3-12C equivalent Cable assembly (supplied with HKC-T950, 0.8 m) 1-823-599-11 *3
MIC IN (3P MALE)	1-508-083-00 XLR, 3P, Female or ITT Cannon XLR-3-11C equivalent Cable assembly (supplied with HKC-T950, 0.8 m) 1-823-599-11 *3
RET CONTROL (6P FEMALE)	1-560-078-00 Plug, 6P Male or HIROSE HR10-7PA-6P equivalent
DC OUT (4P FEMALE)	1-566-425-11 Plug, 4P Male or HIROSE HR10A-7P-4P equivalent
INTERCOM INCOM (5P FEMALE)	1-508-370-11 XLR, 5P Male or ITT Cannon XLR-5-12C equivalent Cable assembly (supplied with HKC-T950, 0.8 m) 1-823-600-11 *3
INCOM (5P MALE)	1-508-363-00 XLR, 5P Female or ITT Cannon XLR-5-11C equivalent Cable assembly (supplied with HKC-T950, 0.8 m) 1-823-600-11 *3
VTR CAM BODY	1-564-184-00 Plug, 26P Female or Cable assembly *3 HDCZ-A10 (supplied with HKC-T950, 10 m) 1-823-615-11 HDCZ-A25 (option, 25 m) 1-823-616-11 HDCZ-A50 (option, 50 m) 1-823-617-11
OPT HEAD (26P FEMALE)	1-564-183-31 Plug, 26P Male or Cable assembly *3 HDCZ-A10 (supplied with HKC-T950, 10 m) 1-823-615-11 HDCZ-A25 (option, 25 m) 1-823-616-11 HDCZ-A50 (option, 50 m) 1-823-617-11
DC IN (4P MALE)	1-508-362-00 XLR, 4P Female or ITT Cannon XLR-4-11C equivalent, or Cable assembly 1-551-577-00 (Supplied with AC-550/550CE)
REMOTE (8P FEMALE)	1-766-848-11 Plug, 8P Male or CCA-5 cable assembly (option) *2 CCA-5-10 (10 m) /CCA-5-3 (3 m) or REMOTE cable 1-783-372-11 (supplied with RM-B150, 10 m) *1 *2
TRACKER (20P FEMALE)	HIROSE HR25-9P-20P equivalent
VF (20P FEMALE)	Cable assembly (supplied with HKC-T950, 0.7 m) 1-792-603-21

*1 *Use of the REMOTE cable enables the operator to monitor video signals.*

*2 *If using a cable of length different from that of a standard length, contact your local Sony Sales Office/Service Center.*

*3 *Only for HKC-T950.*

8-2. HDCU-900, HD Camera Control Unit

8-2-1 *Connector Input/Output Signals*

8-2-1-1 BNC connector

HDCU-900

1125 digital signal
SERIAL RET INPUT (1-4) : BNC
1.485 Gbps/1.4835 Gbps
SMPTE 292M
SERIAL OUTPUT (1-3, MONI): BNC
0.8 V p-p, 75 Ohms, 1.485 Gbps/1.4835 Gbps
SMPTE 292M
REFERENCE IN: BNC
±0.3 V, tri-level SYNC, 75 Ohms
Or, Black burst
0.286 V p-p, 75 Ohms (for UC)
0.3 V p-p, 75 Ohms (for CE)

SD (525/625) digital signal
SERIAL RET INPUT (1-4): BNC
Component serial signal: 270 Mbps
SMPTE 259M
SERIAL OUTPUT (1-4): BNC
Component serial signal: 0.8 V p-p, 75 Ohms, 270 Mbps
SMPTE 259M

Analog signal
PIX OUT: BNC
1.0 V p-p, 75 Ohms
WF OUT: BNC
1.0 V p-p, 75 Ohms
[SYNC|OUT]: BNC
±0.3 V, ternary SYNC, 75 Ohms
0.3 V p-p, SD SYNC, 75 Ohms selectable
CHARACTER: BNC
525/625 black and white
Picture: 0.5 V, Sync: 0.3 V, 75 Ohms

Others
DIGITAL AUDIO: BNC
AES/EBU format
PROMPTER IN: BNC
1.0 V p-p, 75 Ohms

HKCU-901 (525/625 analog signal)
RET INPUT (1-4): BNC
1.0 V p-p, 75 Ohms
Y/G OUTPUT: BNC
Y : 1.0 V p-p (picture: 0.714 V, sync : 0.286 V), 75 Ohms
G : 0.7 V, 75 Ohms
B-Y/B OUTPUT: BNC
B-Y : 0.7 V p-p, 75 Ohms
(for UC : during 75 % color bar input)
0.525 V p-p, 75 Ohms
(for CE : during 75 % color bar input)
B : 0.7 V, 75 Ohms
R-Y/R OUTPUT: BNC
R-Y : 0.7 V p-p, 75 Ohms
(for UC : during 75 % color bar input)
0.525 V p-p, 75 Ohms
(for CE : during 75 % color bar input)
R : 0.7 V, 75 Ohms
VBS OUT (1-2): BNC
1.0 V p-p, 75 Ohms
PIX OUT: BNC
1.0 V p-p, 75 Ohms
WF OUT: BNC
0.714 V p-p, 75 Ohms
ENC : 1.0 V p-p
SYNC OUT: BNC
0.3 V p-p, SD SYNC, 75 Ohms

HKCU-902 (1125 analog signal)
RET INPUT (1-4): BNC
1.0 V p-p (picture : 0.7 V, sync : ±0.3 V), 75 Ohms
Y/G OUTPUT (1-2): BNC
1.0 V p-p (picture : 0.7 V, sync : ±0.3 V), 75 Ohms
PB/B OUTPUT (1-2): BNC
B : 1.0 V p-p (picture : 0.7 V, sync : ±0.3 V), 75 Ohms
PB : Picture : ±0.35 V, Sync : ±0.3 V, 75 Ohms
PR/R OUTPUT (1-2): BNC
R : 1.0 V p-p (picture : 0.7 V, sync : ±0.3 V), 75 Ohms
PR : Picture : ±0.35 V, Sync : ±0.3 V, 75 Ohms
PIX OUT: BNC
1.0 V p-p (picture : 0.7 V, sync : ±0.3 V), 75 Ohms
: BNC
±0.3 V, ternary SYNC, 75 Ohms

HKCU-903 (1125 digital signal)
SERIAL RET INPUT (1-4): BNC
1.485 Gbps/1.4835 Gbps
SMPTE 292M
SERIAL OUTPUT (1-3, MONI): BNC
0.8 V p-p, 75 Ohms, 1.485 Gbps/1.4835 Gbps
SMPTE 292M

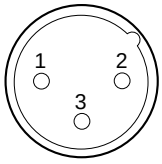
Analog signal
SYNC OUT: BNC
±0.3 V, ternary SYNC, 75 Ohms
[SYNC|OUT] : BNC
±0.3 V, ternary SYNC, 75 Ohms
FRAME REFERENCE IN : BNC
±0.3 V, ternary SYNC, 75 Ohms
Black burst
0.286 V p-p, 75 Ohms (for UC)
0.3 V p-p, 75 Ohms (for CE)
FRAME REFERENCE OUT: BNC
THROUGH OUT/0.3 V p-p, FRAME SYNC pulse, 75 Ohms

HKCU-904 (720/60P signal)
SERIAL RET INPUT (1-4): BNC
1.485 Gbps/1.4835 Gbps
SMPTE 292M
SERIAL OUTPUT (1-3): BNC
0.8 V p-p, 75 Ohms, 1.485 Gpbs/1.4835 Gbps
SMPTE 292M
SYNC OUT: BNC
±0.3 V, ternary SYNC, 75 Ohms
[SYNC|OUT] : BNC
±0.3 V, ternary SYNC, 75 Ohms
0.3 V p-p, SD SYNC, 75 Ohms selectable

8-2-1-2 CAMERA connector (optical/electrical connector)

VIDEO	Y/PB/PR 1.485 Gbps/1.4835 Gbps serial SMPTE 292M
RET VIDEO	Y/PB/PR 1.485 Gbps/1.4835 Gbps serial SMPTE 292M
INCOM	2ch
MIC	2ch
DIGITAL AUDIO (AES/EBU)	
CAMERA COMMAND	
PROMPTER	

8-2-1-3 AUDIO OUTPUT CH-1/CH-2 (XLR 3-pin, Male)

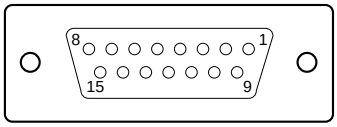


(External view)

No.	Signal	Specifications
1	MIC OUT (G)	0 dBu/_20 dBu (Selectable with S402, S403/AT board)
2	MIC OUT (X)	
3	MIC OUT (Y)	

(0 dBu = 0.775 Vrms)

8-2-1-4 MIC REMOTE (D-sub 15-pin, Female)



(External view)

No.	Signal	Specifications
1	+5.5 V OUT	Max. 250 mA
2	TALLY GND	GND for TALLY
3	G TALLY OUT	ON (GND) : Max. 30 mA IN
4	R TALLY OUT	ON (GND) : Max. 30 mA IN
5	CHU MIC CONT2	*1 Refer to the below column.
6	AMP CONT1	*1 Refer to the below column.
7	GAIN IN CONT0	*1 Refer to the below column.
8	MIC1 GAIN CONT ON/OFF IN	*2 Refer to the below column
9	GND	GND for +5.5 V
10	TALLY OUT	R/G TALLY OUT ON (GND) : Max. 30 mA IN
11	NC	No connection
12	ASPECT REMOTE ON/OFF	L : REMOTE
13	ASPECT CONT1	*3 Refer to the below column.
14	CTL CONT2	*3 Refer to the below column.
15	MIC2 GAIN CONT ON/OFF IN	*2 Refer to the below column.

**1 CHU MIC 1/2 AMP GAIN*

CONT0	CONT1	CONT2	CHU MIC AMP GAIN
H	H	H	60 dB
L	H	H	50 dB
H	L	H	40 dB
L	L	H	30 dB
H	H	L	20 dB

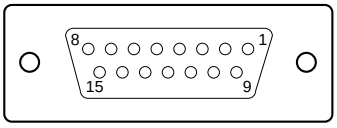
**2*

8pin	15pin	MIC GAIN CONT
L	L	MIC 1 and 2 ON
L	H	MIC 1 ON
H	L	MIC 2 ON
H	H	INTERNAL set

**3*

CONT1	CONT2	ASPECT
L	H	SQ (16 : 9)
H	H	EC (4 : 3)
L	L	INTERNAL set
H	L	LB (4 : 3)

8-2-1-5 WF REMOTE (D-sub 15-pin, Female)



(External view)

Recall system*4

No.	Signal	Specifications
1	NC	No connection
2	NC	No connection
3	NC	No connection
4	NC	No connection
5	RECALL2 (G)	LOW ACTIVE
6	RECALL3 (B)	LOW ACTIVE
7	RECALL1 (R)	LOW ACTIVE
8	RECALL4 (SEQ)	LOW ACTIVE
9	GND	
10	NC	No connection
11	NC	No connection
12	RECALL5 (ENC)	LOW ACTIVE
13	RECALL6 (R+B)	LOW ACTIVE
14	RECALL7 (R+G)	LOW ACTIVE
15	RECALL8 (G+B)	LOW ACTIVE

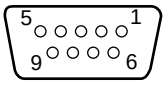
1735HD/1730HD*4

No.	Signal	Specifications
1	LINE/FIELD	LINE : 5 V dc FIELD : 0 V dc
2	FOUR OUT	FOUR : 0 V dc
3	ONE/TWO OUT	ONE : 5 V dc TWO : 0 V dc
4	REMOTE 1 OUT	REMOTE : 5 V dc ENB : 0 V dc
5	RECALL 1 OUT	RECALL : 5 V dc
6	STORE OUT	STORE : 0 V dc
7	RECALL 0 OUT	RECALL : 5 V dc
8	THREE OUT	THREE : 0 V dc
9	GND	GND for signal
10	REMOTE SYNC	REMOTE SYNC : 5 V dc
11	BOTH OUT	BOTH : 0 V dc
12	CH-1-ON OUT	CH-1 ON : 0 V dc
13	CH-2-ON OUT	CH-2 ON : 0 V dc

No.	Signal	Specifications
14	CH-3-ON OUT	CH-3 ON : 0 V dc
15	A/B OUT	A : 5 V dc B : 0 V dc

*4 This is set using the S103-4 and -5 switches on the AT-141 board.
4 : ON : Recall system (5 : OFF 1125 SDI/ON 525/625 SDI)
4 : OFF : 1735HD/1730HD

8-2-1-6 TRUNK LINE (D-sub 9-pin, Female)

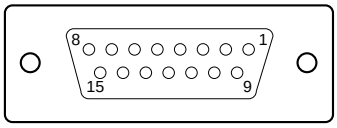


(External view)

No.	Signal	Specifications
1	NC (DCD IN)*5	No connection
2	EXT-CMD0-IN (RXD IN)*5	
3	EXT-CHD0-OUT (TXD OUT)*5	
4	(DTR-OUT)*5	12 V, 15 kOhms
5	GND	
6	(DSR IN)*5	No connection
7	EXT-CMD1-OUT (RTS OUT)*5	
8	EXT-CHD1-IN (CTS IN)*5	
9	NC	No connection

*5 This is set using the S1 switch on the AT-141 board.
AT : (AUX)
DPR : Set using TRUNK.

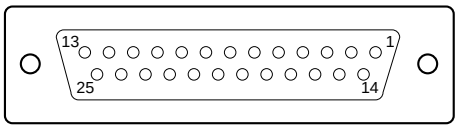
8-2-1-7 I/O PORT (D-sub 15-pin, Female)



(External view)

No.	Signal	Specifications
1	IN1	GND/+5 V, OPEN (47 kOhms +5 V PULL UP)
2	IN2	GND/+5 V, OPEN (47 kOhms +5 V PULL UP)
3	IN3	GND/+5 V, OPEN (47 kOhms +5 V PULL UP)
4	IN4	GND/+5 V, OPEN (47 kOhms +5 V PULL UP)
5	IN5	GND/+5 V, OPEN (47 kOhms +5 V PULL UP)
6	IN6	GND/+5 V, OPEN (47 kOhms +5 V PULL UP)
7	IN7	GND/+5 V, OPEN (47 kOhms +5 V PULL UP)
8	IN8	GND/+5 V, OPEN (47 kOhms +5 V PULL UP)
9	GND	
10	OUT1	0/+5 V (1 kOhms)
11	OUT2	0/+5 V (1 kOhms)
12	OUT3	0/+5 V (1 kOhms)
13	OUT4	0/+5 V (1 kOhms)
14	OUT5	0/+5 V (1 kOhms)
15	OUT6	0/+5 V (1 kOhms)

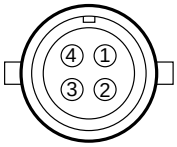
8-2-1-8 INTERCOM/TALLY/PGM (D-sub 25-pin, Female)



(External view)

No.	Signal	Specifications
1	ENG (R) (X) OUT	ENG SYSTEM RECEIVE 0 dBu BALANCED
2	ENG (R) (Y) OUT	
3	ENG (G)	GND for ENG
4	ENG (T) (X) IN	ENG SYSTEM TALK 0 dBu BALANCED
5	ENG (T) (Y) IN	
6	PGM1 (X) IN	–20 dBu/0 dBu (Selectable with S301/AT board)
7	PGM1 (Y) IN	
8	PGM1 (G) IN	
9	GND	GND for AUX
10	AUX3	
11	R TALLY (X) IN	ON : 24 Vdc, TTL (H), SHORT OFF : 0 Vdc, TTL (L), OPEN
12	R TALLY (Y) IN	
13	GND	CHASSIS GND
14	PROD (R) (X) OUT	PROD SYSTEM RECEIVE 0 dBu BALANCED
15	PROD (R) (Y) OUT	
16	PROD (G)	GND for PROD
17	PROD (T) (X) IN	PROD SYSTEM TALK 0 dBu BALANCED
18	PROD (T) (Y) IN	
19	PGM2 (X) IN	–20 dBu/0 dBu (Selectable with S302/AT board)
20	PGM2 (Y) IN	
21	PGM2 (G) IN	
22	AUX4	
23	AUX5	
24	G TALLY (X) IN	ON : 24 Vdc, TTL (H), SHORT OFF : 0 Vdc, TTL (L), OPEN
25	G TALLY (Y) IN	

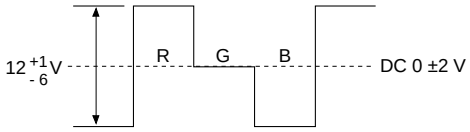
8-2-1-9 WF MODE (4-pin, Female)



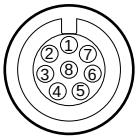
(External view)

No.	Signal	Specifications
1	SEQ CONT OUT (G)	OPEN COLLECTOR +(PNP)/–(NPN) (Selectable with COP1/ VDA board)
2	SEQ CONT OUT (X)	
3	STAIR CASE OUT (X)	*6
4	STAIR CASE OUT (G)	GND for STAIR CASE

*6 Stair Case signa



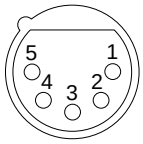
8-2-1-10 RCP/CNU (8-pin, Female)



(External view)

No.	Signal	Specifications
1	TX (+)	CCU SERIAL DATA
2	TX (–)	
3	RX (+)	RCP/CNU/BVP/MSU/VCS SERIAL DATA
4	RX (–)	
5	TX GND	GND for TX
6	POWER (+) OUT	RCP POWER, +30 V
7	POWER (–) OUT	GND for POWER
8	SPARE	

8-2-1-11 INTERCOM (5-pin, Female)



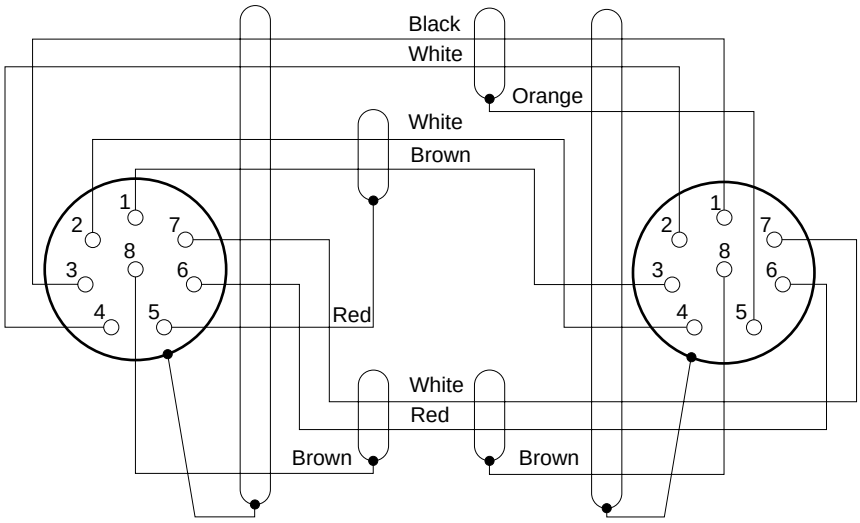
(External view)

No.	Signal	Specifications
1	INCOM (T) IN (Y)	–20 dBu (CARBON MIC) –60 dBu (DYNAMIC MIC)
2	INCOM (T) IN (X)	
3	INCOM (T) IN (G)	GND for INCOM
4	INCOM (R) OUT (X)	GND for POWER Max. 12 dBu
5	NC	No connection

(0 dBu = 0.775 Vrms)

8-2-2 *Cable Wiring Diagram*

CCA-5 cable (for RCP/CNU connector)



8-2-3 *Connection Connectors*

When connecting cables to each connector of the connector panel during installation or service, connect the following connectors or equivalent to the tip.

Connector	Connector/cable
HDCU-900 REFERENCE IN PIX OUT WF OUT SYNC OUT CHARACTER DIGITAL AUDIO PROMPTER IN	1-564-742-11 PLUG, BNC or B-B cable assembly (1.5 m, optional)

HKCU-901
RET INPUT (1-4)
Y/G OUTPUT
B-Y/B OUTPUT
R-Y/R OUTPUT
VBS OUT (1-2)
PIX OUT
WF OUT
SYNC OUT

HKCU-902
RET INPUT (1-4)
Y/G OUTPUT (1-2)
PB/B OUTPUT (1-2)

Connector	Connector/cable
PR/R OUTPUT (1-2) PIX OUT SYNC OUT	
HKCU-903 SYNC OUT FRAME REFERENCE IN FRAME REFERENCE OUT	
HKCU-904 SYNC OUT (BNC)	
HDCU-900 SERIAL RET INPUT (1-4) SERIAL OUTPUT (1-3, MONI) SERIAL RET INPUT (1-4) SERIAL OUTPUT (1-4)	1-569-370-12 PLUG, BNC or BELDEN8281 Cable or equivalent
HKCU-903 SERIAL RET INPUT (1-4) SERIAL OUTPUT (1-3, MONI)	
HKCU-904 SERIAL RET INPUT (1-4) SERIAL OUTPUT (1-3) (BNC)	
AUDIO OUTPUT CH-1/CH-2 (3-pin, Male)	1-508-083-00 XLP 3-pin female or CANNON XLR-3-11C Equivalent
WF REMOTE/MIC REMOTE	1-506-582-11 D-sub 15-pin, male
I/O PORT (D-sub 15-pin, Female)	or JAE DA-CI-J10 equivalent
INTERCOM/TALLY/PGM (D-sub 25-pin, Female)	D-sub 25-pin, male JAE DA-25PF-N equivalent
WF MODE (4-pin, Female)	1-560-155-00 PLUG, 4-pin male (supplied)
RCP/CNU (8-pin, Female)	1-766-848-11 PLUG, 8-pin male or CCA cable assembly (optional) CCA-5-10 (10 m), CCA-5-3 (3 m)
INTERCOM (5-pin, Female)	1-508-370-11 XLR 5-pin, male or CANNON XLR-5-12C equivalent
TRUNK LINE (D-sub 9-pin, Female)	1-560-651-00 D-sub 9-pin, male or JAE DE-9PF-N equivalent 1-561-749-00 JUNCTION SHELL

8-3. HDCU-950, HD Camera Control Unit

8-3-1 *Connector Input/Output Signals*

8-3-1-1 BNC connector

HDCU-950

1125 digital signal

RET (1 to 3) IN: BNC
Conforms to BTA-S004B, 1.485 Gbps/1.4835 Gbps
SMPTE 292M

SERIAL OUT (1 to 2, MONI): BNC
Conforms to BTA-S004B, 0.8 V p-p, 75 Ohms, 1.485 Gbps/1.4835 Gbps
SMPTE 292M

REFERENCE IN: BNC
±0.3 V, ternary SYNC, 75 Ohms
Or, black burst signal 0.286 V p-p, 75 Ohms

SD (525/625) digital signal

RET (1 to 3) IN: BNC
Component serial signal : 270 Mbps
SMPTE 259M

SD SDI OUT (1 to 2): BNC
Component serial signal : 0.8 V p-p, 75 Ohms, 270 Mbps
SMPTE 259M

Analog signal

PIX OUT: BNC
1.0 V p-p, 75 Ohms

WF OUT: BNC
1.0 V p-p, 75 Ohms

SYNC OUT: BNC
±0.3 V, ternary SYNC, 75 Ohms
Or, 0.3 V p-p, SD SYNC, 75 Ohms selectable

Other

PROMPTER IN : BNC
1.0 V p-p, 75 Ohms

HKCU-951 (525/625 analog signal)

Y/G OUT: BNC
Y : 1.0 V p-p (video: 0.714 V, sync : 0.286 V), 75 Ohms
G : 0.7 V, 75 Ohms

B-Y/B OUT: BNC
B-Y : 0.756 V p-p, 75 Ohms (when 75 % color bar is input)
B : 0.7 V, 75 Ohms

R-Y/R OUT: BNC
R-Y : 0.756 V p-p, 75 Ohms (when 75 % color bar is input)
R : 0.7 V, 75 Ohms

VBS OUT: BNC
1.0 V p-p, 75 Ohms

HKCU-953

1125 digital signal

HD SDI OUT (1 to 2): BNC
Conforms to BTA-S004B, 0.8 V p-p, 75 Ohms, 1.485 Gbps/1.4835 Gbps

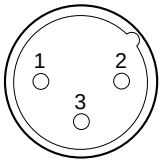
SMPTE 292M

Analog signal
FRAME REFERENCE IN: BNC
±0.3 V, ternary SYNC, 75 Ohms
Or, black burst signal 0.286 V p-p, 75 Ohms
FRAME REFERENCE OUT: BNC
THROUGH OUT/0.3 V p-p, FRAME SYNC pulse, 75 Ohms

8-3-1-2 CAMERA connector (optical/electrical composite connector)

VIDEO	Y/PB/PR Conforms to BTA-S004B, 1.485 Gbps/ 1.4835 Gbps serial SMPTE 292M
RET VIDEO	Y/PB/PR Conforms to BTA-S004B, 1.485 Gbps/ 1.4835 Gbps serial SMPTE 292M
INCOM	2ch
MIC	2ch
DIGITAL AUDIO (AES/EBU)	
CAMERA COMMAND	
PROMPTER	

8-3-1-3 MIC1/MCI2 (XLR 3-pin, Male)



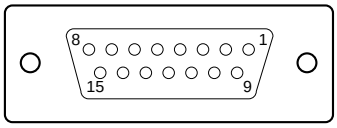
(External view)

No.	Signal	Specifications
1	MIC OUT (G)	0 dBu/-20 dBu (Selectable with S502, S503/AVP-4)
2	MIC OUT (X)	
3	MIC OUT (Y)	

(0 dBu = 0.775 Vrms)

8-3-1-4 MIC REMOTE (D-sub 15-pin, Female)

(**WF REMOTE** (D-sub 15-pin, Female))



(External view)

In the case of MIC REMOTE mode : S423-3/AT-149 ⟶ OFF)

No.	Signal	Specifications
1	+5.5 V OUT	Max. 250 mA
2	TALLY GND	GND for TALLY
3	G TALLY OUT	ON (GND) : Max. 30 mA IN
4	R TALLY OUT	ON (GND) : Max. 30 mA IN
5	CHU MIC CONT2	*1 Refer to the below column.
6	AMP CONT1	*1 Refer to the below column.
7	GAIN IN CONT0	*1 Refer to the below column.
8	MIC1 GAIN CONT ON/OFF IN	*2 Refer to the below column
9	GND	GND for +5.5 V
10	TALLY OUT	R/G TALLY OUT ON (GND) : Max. 30 mA IN
11	NC	No connection
12	ASPECT REMOTE ON/OFF	L : REMOTE
13	ASPECT CONT1	*3 Refer to the below column.
14	CTL CONT2	*3 Refer to the below column.
15	MIC2 GAIN CONT ON/OFF IN	*2 Refer to the below column

**1 CHU MIC 1/2 AMP GAIN*

CONT0	CONT1	CONT2	CHU MIC AMP GAIN
H	H	H	60 dB
L	H	H	50 dB
H	L	H	40 dB
L	L	H	30 dB
H	H	L	20 dB

The setup for the HDCU-700A mode is shown in parenthesis ().
In the case -of theHDCU-700A mode : S423-2/AT-149 ⟶ ON

**2*

8pin	15pin	MIC GAIN CONT
L	L	MIC 1 and 2 ON
L	H	MIC 1 ON
H	L	MIC 2 ON
H	H	INTERNAL set

**3*

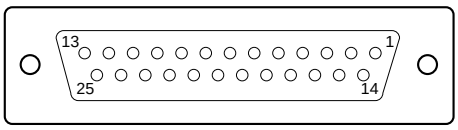
CONT1	CONT2	ASPECT
L	H	SQ (16 : 9)
H	H	EC (4 : 3)
L	L	INTERNAL set
H	L	LB (4 : 3)

In the case of the WF REMOTE mode : S423-3/AT-149⟶ ON Recall system

No.	Signal	Specifications
1	NC	No connection
2	NC	No connection
3	NC	No connection
4	NC	No connection
5	RECALL2 (G)	LOW ACTIVE
6	RECALL3 (B)	LOW ACTIVE
7	RECALL1 (R)	LOW ACTIVE
8	RECALL4 (SEQ)	LOW ACTIVE
9	GND	
10	NC	No connection
11	NC	No connection
12	RECALL5 (ENC)	LOW ACTIVE
13	RECALL6 (R+B)	LOW ACTIVE

No.	Signal	Specifications
14	RECALL7 (R+G)	LOW ACTIVE
15	RECALL8 (G+B)	LOW ACTIVE

8-3-1-5 INTERCOM/TALLY/PGM (D-sub 25-pin, Female)

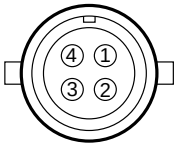


(External view)

No.	Signal	Specifications
1	ENG (R) (X) OUT	ENG SYSTEM RECEIVE 0 dBu BALANCED
2	ENG (R) (Y) OUT	
3	ENG (G)	GND for ENG
4	ENG (T) (X) IN	ENG SYSTEM TALK 0 dBu BALANCED
5	ENG (T) (Y) IN	
6	PGM1 (X) IN	–20 dBu/0 dBu (Selectable with S301/AT board)
7	PGM1 (Y) IN	
8	PGM1 (G) IN	
9	GND	GND for AUX
10	AUX3	
11	R TALLY (X) IN	ON : 24 Vdc, TTL (H), SHORT OFF : 0 Vdc, TTL (L), OPEN
12	R TALLY (Y) IN	
13	GND	CHASSIS GND
14	PROD (R) (X) OUT	PROD SYSTEM RECEIVE 0 dBu BALANCED
15	PROD (R) (Y) OUT	
16	PROD (G)	GND for PROD
17	PROD (T) (X) IN	PROD SYSTEM TALK 0 dBu BALANCED
18	PROD (T) (Y) IN	
19	PGM2 (X) IN	–20 dBu/0 dBu (Selectable with S302/AT board)
20	PGM2 (Y) IN	
21	PGM2 (G) IN	
22	AUX4	
23	AUX5	
24	G TALLY (X) IN	ON : 24 Vdc, TTL (H), SHORT OFF : 0 Vdc, TTL (L), OPEN
25	G TALLY (Y) IN	

(0 dBu = 0.775 Vrms)

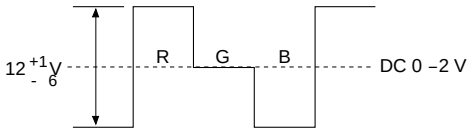
8-3-1-6 WF MODE (4-pin, Female)



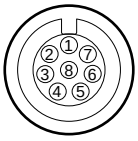
(External view)

No.	Signal	Specifications
1	SEQ CONT OUT (G)	OPEN COLLECTOR +(PNP)/_(NPN) (Selectable with COP1/VDA board)
2	SEQ CONT OUT (X)	
3	STAIR CASE OUT (X)	*6
4	STAIR CASE OUT (G)	GND for STAIR CASE

4 Stair Case signal



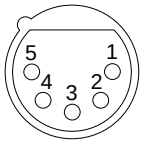
8-3-1-7 RCP/CNU (8-pin, Female)



(External view)

No.	Signal	Specifications
1	TX (+)	CCU SERIAL DATA
2	TX (–)	
3	RX (+)	RCP/CNU/BVP/MSU/VCS SERIAL DATA
4	RX (–)	
5	TX GND	GND for TX
6	POWER (+) OUT	RCP POWER, +30 V
7	POWER (–) OUT	GND for POWER
8	SPARE	

8-3-1-8 INTERCOM (5-pin, Female)



(External view)

No.	Signal	Specifications
1	INCOM (T) IN (Y)	–20 dBu (CARBON MIC) –40 dBu (ECM MIC) –60 dBu (DYNAMIC MIC)
2	INCOM (T) IN (X)	
3	INCOM (T) IN (G)	GND for INCOM
4	INCOM (R) OUT (X)	Max. 12 dBu
5	NC	No connection

(0 dBu = 0.775 Vrms)

8-3-2 *Connection Connectors*

When connecting cables to each connector of the connector panel during installation or service, connect the following connectors or equivalent to the tip.

Connector	Connector/cable
HDCU-950 REFERENCE IN PIX OUT WF OUT SYNC OUT PROMPTER IN	1-569-370-12 PLUG, BNC
HKCU-951 Y/G OUT	

B-Y/B OUT
R-Y/R OUT
VBS OUT

Connector	Connector/cable
HKCU-953	
FRAME REFERENCE IN FRAME REFERENCE OUT	
HDCU-950	1-569-370-12 PLUG, BNC or
RET IN (1-3) SERIAL OUTPUT (1-2, MONI) SD SDI OUT (1-3)	BELDEN8281 Cable or equivalent
HKCU-953	
HD SDI OUT (1-2)	
MIC1/MIC2(3-pin, Male)	1-508-083-00 XLR 3-pin female or CANNON XLR-3-11C equivalent
MIC REMOTE (WF REMTOE) (D-sub 15-pin, Female)	1-506-582-11 D-sub 15-pin, male or JAE DA-CI-J10 equivalent
INTERCOM/TALLY/PGM (D-sub 25-pin, Female)	D-sub 25-pin, male JAE DA-25PF-N equivalent
WF MODE (4-pin, Female)	1-560-155-00 PLUG, 4-pin male (supplied)
RCP/CNU (8-pin, Female)	1-766-848-11 PLUG, 8-pin male or CCA cable assembly (optional) CCA-5-30 (30 m), CCA-5-10 (10 m), CCA-5-3 (3 m)
INTERCOM (5-pin, Female)	1-508-370-11 XLR 5-pin, male or CANNON XLR-5-12C equivalent

8-4. CNU-700, Camera Command Network Unit

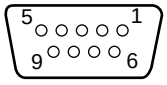
8-4-1 *Connector Input/Output Signals*

Main connector input and output signals are as follows.

8-4-1-1 BNC connector 75 Ohms

[Input Signal]
REFERENCE 300 mV p-p, loop through
[Output Signal]
CHARACTER 700 mV p-p,
300 mV p-p (SYNC)

8-4-1-2 RS232C-1/2/3*1 (9P, Female)



(External view)

RS232C

No.	Signal	Specifications
1	DCD IN	DATA CARRIER DETECT
2	RXD IN	RECEIVED DATA
3	TXD OUT	TRANSMITTED DATA
4	DTR OUT	DATA TERMINAL READY
5	SIGNAL GND	SIGNAL GND
6	DSR IN	DATA SET READY
7	RTS OUT	REQUEST TO SEND
8	CTS IN	CLEAR TO SEND
9	NC	—

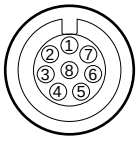
*RS422*2*

No.	Signal	Specifications
1	DCD IN	DATA CARRIER DETECT
2	RXD IN	RECEIVED DATA
3	TXD (+) OUT	TRANSMITTED DATA
4	TXD (-) OUT	TRANSMITTED DATA
5	SIGNAL GND	SIGNAL GND
6	RXD (-) IN	RECEIVED DATA
7	RTS OUT	REQUEST TO SEND
8	CTS IN	CLEAR TO SEND
9	NC	—

*1 *The RS-232C-3 port can be used only when the BKP-7930 is installed.*
*2 *The RS-232C-2 and RS-232C-3 ports can be used for RS-422 interfaceing by changing the switch setting of S802 to S806 on the IF-777 board.*

8-4-1-3 REMOTE (8P, Female)

RCP/CCU/MSU/VCS
AUX 1/2/3/4



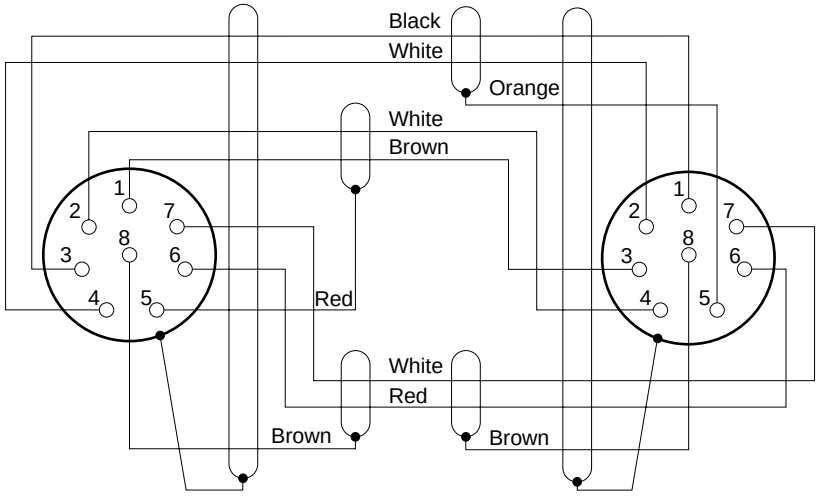
(External view)

No.	Signal	Specifications
1	TX (+)	CNU SERIAL DATA
2	TX (–)	
3	RX (+)	MSU/RCP/CCU/VCS/AUX SERIAL DATA
4	RX (–)	
5	TX GND	GND for TX
6	POWER (+)	*3
7	POWER (–)	*3
8	SPARE	
	CHASSIS GND	CHASSIS GND

*3
CCU1 to CCU6 CONNECTOR
6PIN . . POWER (+) IN
7PIN . . POWER (–) IN
RCP1 to RCP6, AUX1, AUX2, MSU
6PIN . . POWER (+) OUT (RCP POWER +25 V)
7PIN . . POWER (—) OUT (GND for Power)
VCS CONNECTOR
6PIN . . NOT USED
7PIN . . NOT USED

8-4-2 *Cable Wiring*

CCA-5 Cable (for REMOTE connector)



8-4-3 *Connection Connector*

Use the connectors below or the equivalent at its tip when cables are connected to each connector on the connector panel during installation and servicing.

Connector name	Connectoin connector/cable
REFERENCE	1-569-370-12 Connector, BNC
CHARACTER (BNC)	
RS232C (9P, FEMALE)	1-566-354-11 D-SUB, 9P MALE
CCU RCP	1-766-848-11 PLUG, 8P MALE or CCA cable assembly (option)
MSU	CCA-5-10 (10 m)
VCS	CCA-5-3 (3 m)
AUX 1/2/3/4 (8P, FEMALE)	CCA-5-30 (30 m)

8-5. CNU-500, Camera Command Network Unit

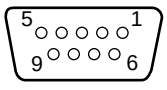
8-5-1 *Connector Input/Output Signals*

Main connector input and output signals are shown below.

8-5-1-1 BNC connector 75 Ohms

[Input Signal]
REFERENCE 300 mVp-p, loop through
[Output Signal]
CHARACTER 700 mVp-p,
300 mVp-p (SYNC)

8-5-1-2 RS232C (9P, Female)

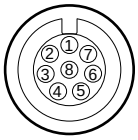


(External view)

No.	Signal	Specifications
1	DCD IN	DATA CARRIER DETECT
2	RXD (+) IN	RECEIVED DATA
3	TXD (+) OUT	TRANSMITTED DATA
4	DTR OUT	DATA TERMINAL READY
5	SIGNAL GND	SIGNAL GND
6	DSR IN	DATA SET READY
7	RTS OUT	REQUEST TO SEND
8	CTS OUT	CLEAR TO SEND
9	NC	—

8-5-1-3 REMOTE (8P, Female)

RCP/CCU/MSU/VCS/AUX



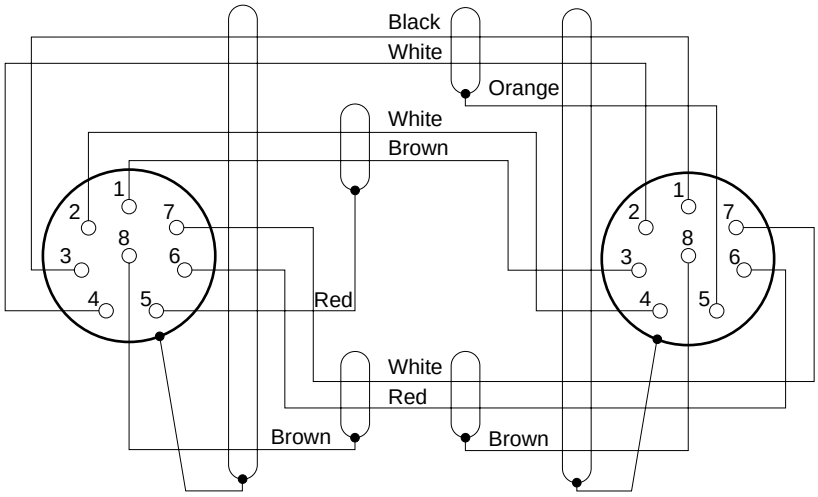
(External view)

No.	Signal	Specifications
1	TX (+)	CNU SERIAL DATA
2	TX (–)	
3	RX (+)	MSU/RCP/CCU/VCS/AUX SERIAL DATA
4	RX (–)	
5	TX GND	GND for TX
6	POWER (+)	*1
7	POWER (–)	*1
8	SPARE	
	CHASSIS GND	CHASSIS GND

*1
CCU1 to CCU6 Connectors
6pin . . POWER (+) IN
7pin . . POWER (–) IN
RCP1 to RCP6, AUX Connectors
6pin . . POWER (+) OUT (RCP POWER +30 V)
7pin . . POWER (–) OUT (GND for Power)
MSU/VCS Connectors
NOT USED

8-5-2 *Cable Wiring*

CCA-5 Cable (for REMOTE connector)



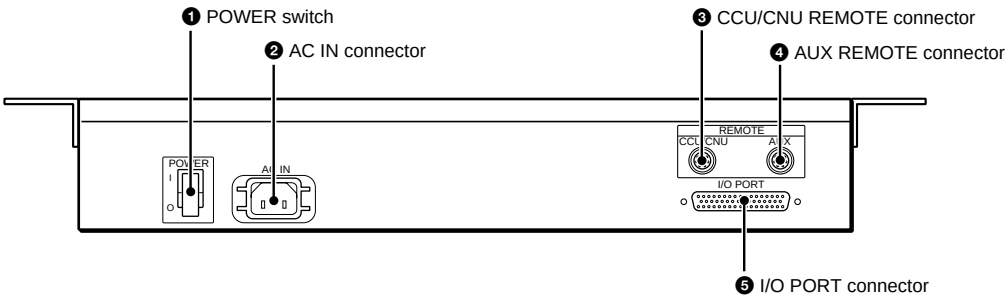
8-5-3 *Connection Connector*

Connections made with the connector panels during installation or service should be made with the connectors/complete cable assemblies specified in the following list, or equivalent parts.

Connector name	Connection connector/cable
REFERENCE	1-569-370-12 Connector, BNC
CHARACTER (BNC)	
RS-232C (9P, FEMALE)	1-566-354-11 D-SUB, 9P MALE
CCU	1-766-848-11 PLUG, 8P MALE
RCP	or CCA cable assembly (option)
MSU	CCA-5-10 (10 m)
VCS	CCA-5-3 (3 m)
AUX (8P, FEMALE)	

8-6. MSU-700A, Master Setup Unit

8-6-1 *Connector Input/Output Signals*



❶ POWER switch
Turns the power to the unit on and off.

❷ ~AC IN (AC power input) connector
Connect to an AC power source using the supplied AC power cord. The power cord can be fixed to this unit using the supplied plug holder.

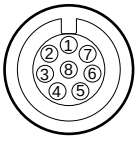
❸ CCU/CNU REMOTE (camera control unit/camera command network unit remote) connector (8-pin)
Connect to the RCP/CNU connector of the CCU-700A/700AP or the MSU connector of the CNU-700.

❹ AUX REMOTE (auxiliary remote) connector (8-pin)

❺ I/O PORT connector (50-pin)
Reserved for future use.
Main connector input and output signals are shown below.

8-6-1-1 REMOTE (8-pin, Female)

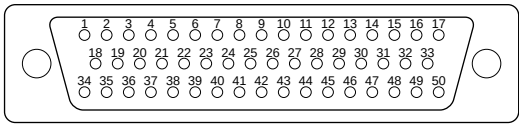
AUX
CCU/CNU



(External view)

No.	Signal	Specifications
1	TX (+)	MSU Serial data
2	TX (–)	MSU Serial data
3	RX (+)	CCU/CNU/AUX Serial data
4	RX (–)	MSU/RCP/CCU/VCS/AUX
5	TX GND	GND for TX
6	POWER (+)	Not used
7	POWER (–)	Not used
8	SPARE	—
	CHASSIS GND	CHASSIS GND

8-6-1-2 I/O PORT (50-pin, Female)



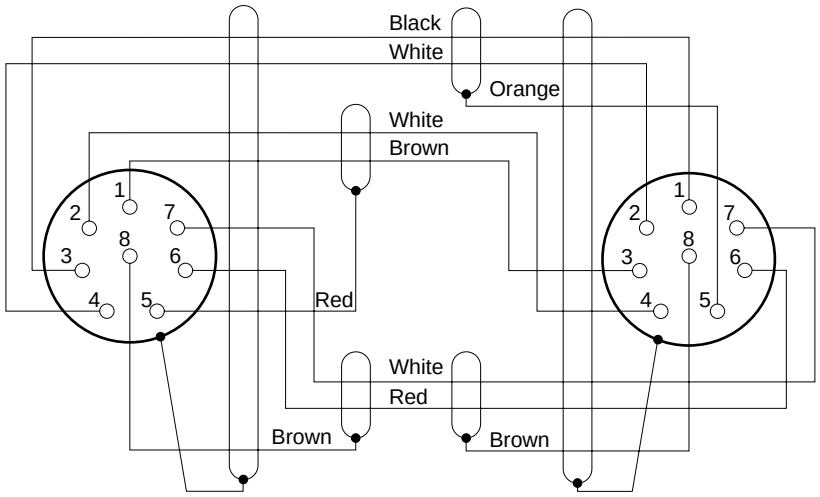
(External view)

Pin No	Signal	Specifications
1	EXT I/O-00	INPUT/OUTPUT PORT*1
2	EXT I/O-03	INPUT/OUTPUT PORT*1
3	EXT I/O-06	INPUT/OUTPUT PORT*1
4	EXT I/O-11	INPUT/OUTPUT PORT *1
5	EXT I/O-14	INPUT/OUTPUT PORT*1
6	EXT I/O-17	INPUT/OUTPUT PORT*1
7	EXT I/O-22	INPUT/OUTPUT PORT*1
8	EXT I/O-25	INPUT/OUTPUT PORT*1
9	EXT I/O-30	INPUT/OUTPUT PORT*1
10	EXT I/O-36	INPUT/OUTPUT PORT*1
11	EXT I/O-03	INPUT/OUTPUT PORT*1
12	EXT I/O-41	OUTPUT PORT*1
13	EXT I/O-44	INPUT PORT*1
14	EXT I/O-47	INPUT PORT*1
15	+12 V OUT	Utility power 12 V
16	+12 V OUT	Utility power 12 V
17	SPARE	No connection
18	EXT I/O-01	INPUT/OUTPUT PORT*1
19	EXT I/O-04	INPUT/OUTPUT PORT*1
20	EXT I/O-07	INPUT/OUTPUT PORT*1
21	EXT I/O-12	INPUT/OUTPUT PORT*1
22	EXT I/O-15	INPUT/OUTPUT PORT*1
23	EXT I/O-20	INPUT/OUTPUT PORT*1
24	EXT I/O-23	INPUT/OUTPUT PORT*1
25	EXT I/O-26	INPUT/OUTPUT PORT*1
26	EXT I/O-31	INPUT/OUTPUT PORT*1
27	EXT I/O-34	INPUT/OUTPUT PORT*1
28	EXT I/O-37	INPUT/OUTPUT PORT*1
29	EXT I/O-42	OUTPUT PORT*1
30	EXT I/O-45	INPUT PORT*1
31	+5 V OUT	Utility power 5 V
32	GND (+5 V)	GND for utility power 5 V
33	GND (+5 V)	GND for utility power 12 V
34	EXT I/O-02	INPUT/OUTPUT PORT*1
35	EXT I/O-05	INPUT/OUTPUT PORT*1
36	EXT I/O-10	INPUT/OUTPUT PORT*1
37	EXT I/O-13	INPUT/OUTPUT PORT*1
38	EXT I/O-16	INPUT/OUTPUT PORT*1
39	EXT I/O-21	INPUT/OUTPUT PORT*1
40	EXT I/O-24	INPUT/OUTPUT PORT*1
41	EXT I/O-27	INPUT/OUTPUT PORT*1
42	EXT I/O-32	INPUT/OUTPUT PORT*1
43	EXT I/O-35	INPUT/OUTPUT PORT*1
44	EXT I/O-40	OUTPUT PORT*1
45	EXT I/O-43	OUTPUT PORT*1
46	EXT I/O-46	INPUT PORT*1
47	+5 V OUT	Utility power 5 V
48	GND (+5 V)	GND for utility power 5 V
49	GND (+12 V)	GND for utility power 12 V
50	SPARE	No connection

*1
INPUT *ON: 5 V*
OFF : 0 V
OUTPUT *TTL LEVEL*
Darlington transistor drive
One port: max 5 mA
(VEXT: 1.5 V, RETX: 1.1 kOhms)
All ports total: max 60 mA

8-6-2 *Cable Wiring*

CCA-5 Cable



8-pin connector (Male)
(Wiring side)

8-pin connector (Male)
(Wiring side)

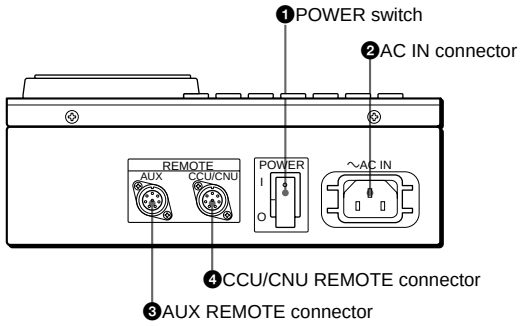
8-6-3 *Connection Connector*

Connections made with the connector panels during installation or service should be made with the connectors/complete cable assemblies specified in the following list, or equivalent parts.

Connector name	Connection connector/cable	
REMOTE AUX (8-pin)	Plug 8-pin, Male (Sony part number: 1-766-848-11)	CCA-5 cable assembly (Option) CCA-5-3 (3 m)/CCA-5-10 (10 m)
REMOTE CCU/CNU (8-pin)	or	
I/O PORT (50-pin)	Plug, D-SUB 50-pin, Male (Sony part number: 1-566-358-11) or JAE DDU-50PF-F0 or equivalent	

8-7. MSU-750, Master Setup Unit

8-7-1 *Connector Panel*



❶ POWER switch
Turns the power on and off of this unit.

❷ AC IN (AC power input) connector
Connect to an AC power source using an optional AC power cord. The power cord can be fixed to this unit using an optional plug retainer.

❸ AUX REMOTE (auxiliary remote) connector (8-pin)

❹ CCU/CNU REMOTE (camera control unit/camera command network unit remote) connector (8-pin)
Connect to the RCP/CNU connector of the CCU or the MSU connector of the CNU.

8-8. RCP-750/751, Remote Control Panel

8-8-1 *Connector Input/Output Signals*

8-8-1-1 AUX REMOTE

CCU/CNU REMOTE
(8P, Female)

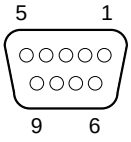


(External view)

No.	Signal	Specifications
1	TX (+)	RCP SERIAL DATA
2	TX (–)	
3	RX (+)	CCU/CNU/AUX SERIAL DATA
4	RX (–)	
5	TX GND	GND for TX
6	POWER (+) IN	RCP POWER, +10 V to +30 V
7	POWER (–) IN	GND for POWER
8	SPARE	
C	CHASSIS GND	CHASSIS GND

8-8-1-2 EXT I/O

(9P Female)



(External view)

No.	Signal	Specifications
1	PREVIEW S1	CONTACT (X) (Modification is required for some units)
2	PREVIEW S2	CONTACT (Y) (Modification is required for some units)
3	SPARE I/O PORT 1	(CMOS LEVEL 3.3 HI ACTIVE) Assignable
4	SPARE I/O PORT 2	(CMOS LEVEL 3.3 HI ACTIVE) Assignable
5	SPARE I/O PORT 3	(CMOS LEVEL 3.3 HI ACTIVE) Assignable
6	SPARE I/O PORT 4	(CMOS LEVEL 3.3 HI ACTIVE) Assignable
7	SPARE I/O PORT 5	(CMOS LEVEL 3.3 HI ACTIVE) Assignable
8	POWER OUT	+5V DC
9	GND	—

8-8-2 *Connection Connector*

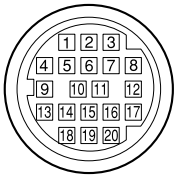
Connections made with the connector panels during installation or service should be made with the connectors/complete cable assemblies specified in the following list, or equivalent parts.

Connector function	Connection connector
AUX REMOTE	1-706-848-11 PLUG, 8P MALE or
CCU/CNU REMOTE (8P, FEMALE)	Cable assembly (Option) CCA-5-3 (3 m), CCA-5-10 (10 m), CCA-5-30 (30 m)
EXT I/O	1-560-651-00 D-SUB 9P, MALE
(9P, Female)	1-561-749-00 JUNCTION SHELL 9P

8-9. HDVF-20A, HD Electronic Viewfinder

8-9-1 *Connector Input/Output Signals*

VF (20P Male)



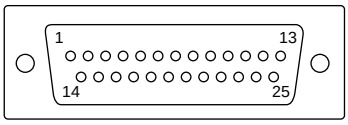
(External view)

Pin No	Signal	I/O	Specifications
1	S-DATA	IN/OUT	TTL level
2	NC		
3	POWER OFF CTL	IN	ON : OPEN OFF : GND
4	SCK	IN	TTL level
5	COLOR/ BW	OUT	B/W : GND COLOR : OPEN
6	NC		
7	NC		
8	G TALLY	IN	ON : 5V OFF : GND
9	PEAKING CTL	OUT	VF to CAM (Ro = 1 kOhms) 0 V to 5 V 0 V : PEAKING OFF 5 V : PEAKING MAX
10	NC		
11	NC		
12	Y VIDEO	IN	1.0 V p-p (Ro = 75 kOhms)
13	VIDEO GND		
14	NC		
15	NC		
16	NC		
17	R TALLY	IN	ON : 5 V OFF : GND
18	NC		
19	UNREG GND		
20	UNREG		+10.5 V to 17 V

8-10. HDVF-700A, HD Electronic Viewfinder

8-10-1 *Connector Input/Output Signals*

D-sub (25P Male)



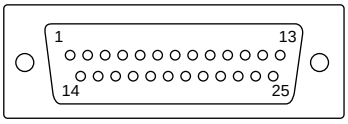
(External view)

Pin No	Signal	I/O	Specifications
1	VIDEO IN	IN	1.0 V p-p, 75 Ohms
2	NC		
3	NC		
4	NC		
5	NC		
6	PEAKING ON/OFF	OUT	ON: +5 V OFF: 0 V
7	+12 V IN	IN	+10.5 to +20 V
8	+12 V IN	IN	+10.5 to +20 V
9	NC		
10	S-DATA	OUT	TTL level
11	R TALLY	IN	ON: +5 V OFF: 0 V
12	EFFECT	IN	ON: +5 V OFF: 0 V
13	NC		
14	VIDEO GND		
15	S-CK	IN	TTL level
16	BATT	IN	ON: +5 V OFF: 0 V
17	CHASSIS GND		
18	G TALLY	IN	ON: +5 V OFF: 0 V
19	GND (+12 V)		
20	GND (+12 V)		
21	VF-SEL	IN	BW: 0 V COLOR: +5 V
22	H EXPAND	IN	BW: 0 V COLOR: +5 V
23	NC		
24	NC		
25	V EXPAND	IN	ON: GND OFF: +5 V

8-11. HDVF-C700W, HD Electronic Viewfinder

8-11-1 *Connector Input/Output Signals*

D-sub (25P Male)



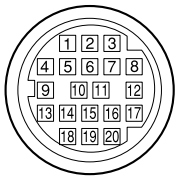
(External view)

Pin No	Signal	I/O	Specifications
1	Y VIDEO (X)	IN	1.0 V p-p, Zi = 75 Ohms
2	PR VIDEO GND	—	GND for PR VIDEO
3	PR VIDEO (X)	IN	0.7 V p-p, Zi = 75 Ohms
4	PB VIDEO GND	—	GND for PB VIDEO
5	PB VIDEO (X)	IN	0.7 V p-p, Zi = 75 Ohms
6	PEAKING CTL	OUT	ON: +5 V OFF: GND
7	UNREG	IN	+10.5 to +17 V
8	UNREG	IN	+10.5 to +17 V
9	NC		No connection
10	S-DATA	IN/OUT	TTL level
11	R TALLY	IN	ON: +5 V OFF: 0 V
12	NC		No connection
13	NC		No connection
14	Y VIDEO GND	—	GND for Y VIDEO
15	S-CK	IN	TTL level
16	NC		No connection
17	CHASSIS GND	—	GND for CHASSIS
18	G TALLY	IN	ON: +5 V OFF: GND
19	UNREG	—	GND for UNREG
20	UNREG	—	GND for UNREG
21	COLOR/BW	OUT	BW: GND COLOR: OPEN
22	H EXPAND		No connection
23	NC		No connection
24	NC		No connection
25	NC		No connection

8-12. HDVF-C750W, HD Electronic Viewfinder

8-12-1 *Connector Input/Output Signals*

VF (20P Male)



(External view)

Pin No	Signal	I/O	Specifications
1	S-DATA	IN/OUT	TTL level
2	NC		No connection
3	NC		No connection
4	S-CK	IN	TTL level
5	COLOR/BW	OUT	B/W : GND COLOR : OPEN
6	NC		No connection
7	NC		No connection
8	G TALLY	IN	ON : +5 V OFF : GND
9	PEAKING	OUT	VF to CAM (Zi = 1 kOhms) CTL ON: +5 V OFF: GND
10	NC		No connection
11	NC		No connection
12	Y VIDEO	IN	1.0 V p-p (Zi = 75 Ohms)
13	VIDEO GND	—	GND for VIDEO
14	PB VIDEO	IN	0.7 V p-p, Zi = 75 Ohms
15	PR VIDEO	IN	0.7 V p-p, Zi = 75 Ohms
16	NC		No connection
17	R TALLY	IN	ON : +5 V OFF : GND
18	NC		No connection
19	UNREG GND	—	GND for UNREG
20	UNREG	IN	+10.5 V to 17 V

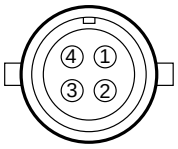
8-13. VCS-700, Video Selector

8-13-1 *Connector Input/Output Signals*

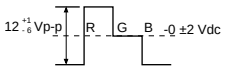
Main connector input and output signals are shown below.

PIX 1 to PIX 6 INPUT:	1.0 Vp-p (VBS), 75 Ohms
WF 1 to WF 6 INPUT:	1.0 Vp-p (VBS)/0.714 Vp-p (V), 75 Ohms
CHARACTOR INPUT:	0.7 Vp-p (V), 75 Ohms
PIX A INPUT:	1.0 Vp-p(VBS), 75 Ohms
WF A INPUT:	1.0 Vp-p (VBS), 75 Ohms
PIX A, PIX B OUTPUT:	1.0 Vp-p (VBS), 75 Ohms
WF A, WF B OUTPUT:	1.0 Vp-p (VBS)/0.714 Vp-p (V), 75 Ohms
SYNC OUTPUT:	0.3 Vp-p, 75 Ohms, negative

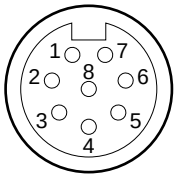
8-13-1-1 WF Mode (4P, Female)



(External view)

Pin No	Signal	Specifications
1	SEG CONT OUT (G)	OPEN COLLECTOR
2	SEG CONT OUT(X)	
3	STAIR CASE OUT (X)	STAIR CASE SIGNAL 
4	STAIR CASE OUT (G)	

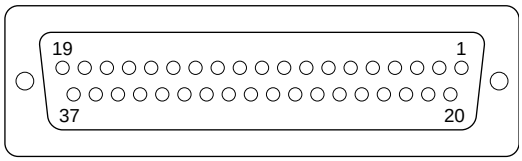
8-13-1-2 Remote (8P, Female)



(External view)

Pin No	Signal	Specifications
1	TX(+)	VCS SERIAL DATA
2	TX(–)	
3	RX(+)	MSU/CNU SERIAL DATA
4	RX(–)	
5	TX GND	GNE for TX
6	POWER (+)	NOT USED
7	POWER (–)	NOT USED
8	SPARE	—
	CHASSIS GND	CHASSIS GND

8-13-1-3 I/O Port (D-SUB 37P, Female)



– External view –

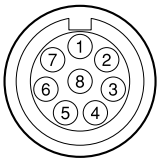
Pin No	Signal	Specifications
1	CH1 ON IN	L: ON H: OFF
2	CH2 ON IN	
3	CH3 ON IN	
4	CH4ON IN	
5	CH5 ON IN	
6	CH6 ON IN	
7	PIX/WF SEL 1 IN	SEL 1: L, SEL 2: L — NC SEL 1: H, SEL 2: L — WF/PIX SEL 1: L, SEL 2: H — WF SEL 1: H, SEL 2: H — PIX
8	PIX/WF SEL 2 IN	
9	PORT ENB IN	L: ACTIVE
10	SW RESET IN	L: RESET
11	NC	—
12	NC	
13	NC	
14	NC	
15	NC	
16	NC	
17	NC	
18	NC	
19	+5V	POWER SUPPLY OUT max. 500 mA
20	CH1 LED OUT	(NPN TRANSISTOR) OPEN COLLECTOR OUT ON: LOW
21	CH2 LED OUT	
22	CH3 LED OUT	
23	CH4 LED OUT	
24	CH5 LED OUT	
25	CH6 LED OUT	
26	SEQ 3A ON IN	L: ON, H: OFF CH 1, 2 and 3 of WF INPUT will be output in sequence when the pin status is LOE (ON)
27	SEQ 3B ON IN	L: ON, H: OFF CH 4, 5 and 6 of WF INPUT will be output in sequence when the pin status is LOE (ON)
28	NC	—
29	NC	
30	NC	
31	NC	
32	NC	—
33	NC	
34	NC	
35	NC	
36	GND	SIGNAL GND
37	GND	FRAME GND

8-14. CA-905L, Large Lens Adaptor

8-14-1 *Connector Input/Output Signals*

FIBER (CA-905L): LEMO type

8-14-1-1 REMOTE (8P, Male)



(External view)

Pin No	Signal	I/O	Specifications
1	NC		No connection
2	NC		No connection
3	IIC DATA		SERIAL DATA
4	IIC CLK		SERIAL DATA
5	GND		GND for DATA
6	POWER (+)	IN	+12 V
7	POWER (–)	IN	GND for +12V
8	NC		(VIDEO (X) IN)
	CHASSIS GND	—	CHASSIS GND

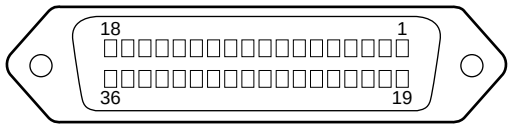
8-14-1-2 LENS (12P, Male)



(External view)

Pin No	Signal	I/O	Specifications
1	RET VIDEO ENABLE	OUT	ENABLE: GND DISABLE: +5 V or OPEN
2	RET 2 ENABLE	OUT	ENABLE: GND DISABLE: +5 V or OPEN
3	GND	—	GND
4	AUTO +5 V	IN	AUTO: +5 V MANU: 0 V or OPEN
5	IRIS CONT	IN	+2.0 V to +7.0 V (+3.4 V = F16, +6.2 V = F2.8)
6	NC		(UNREG)
7	IRIS POSITION	OUT	+2.0 V to +7.0 V (+3.4 V = F16, +6.2 V = F2.8)
8	AUTO/MANU	IN	AUTO IRIS: 0 V MANUAL IRIS: +5 V
9	EXTENDER ON/ OFF	OUT	EX ON: 0 V OFF: +4.8 V
10	ZOOM POSITION	OUT	WIDE: +2 V TELE: +7 V
11	LAUX1 (SERIAL RXD)	OUT	LENS AUX (LENS SERIAL DATA)
12	LAUX1 (SERIAL TXD)	IN	LENS AUX (LENS SERIAL DATA)

8-14-1-3 LENS (36P, Female)



(External view)

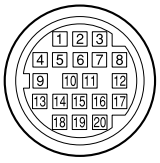
Pin No	Signal	I/O	Specifications
1	NC		No connection
2	NC		No connection
3	NC		No connection
4	+12 V (LENS)	OUT	+12 V (2 A max)
5	LENS DC GND	—	GND for +12 V (LENS)
6	GND	—	GND
7	(Z POT FOL-LOW)		No connection
8	LENS EXT1 (SERIAL RXD)	IN	*2 (LENS SERIAL DATA)
9	LENS EXT2	IN	*2
10	LENS EXT3	IN	*2
11	LENS AUX	OUT	ON: GND OFF: High impedance
12	IRIS POSI	IN	Zi ≥10 kOhms 2 to 7 V “3.4 ±0.1 V (F16)” “6.2 ±0.1 V (F2.8)”
13	ZOOM POSI	IN	Zi ≥10 kOhms 2 to 7 V 2 V (WIDE), 7 V (TELE)
14	RET 1 ON	IN	Zi ≥10 kOhms ON: L OFF: High impedance
15	RET 2 ON	IN	Zi ≥10 kOhms ON: L OFF: High impedance
16	FOCUS POSI	IN	Zi ≥10 kOhms 2 to 7V 2 V (MIN), 7 V (∞)
17	IRIS CONT	OUT	2 to 7 V “3.4 ± 0.1 V (F16)” “6.2 ± 0.1 V (F2.8)” Zo ≤1 kOhms
18	IRIS AUTO/ MANU (SERIAL TXD)	OUT	AUTO: L MANU: H Zo ≤1 kOhms (LENS SERIAL DATA)
19	NC		No connection
20	NC		No connection
21	LENS R TALLY ON	OUT	ON: L OFF: H Zo ≥1 kOhms
22	EXP POSITION	IN	Zi ≥ 10 kOhms 1 to 4 V 1 V: –7.5° 4 V: +7.5°
23	RET 3 ON	IN	Zi ≥10 kOhms ON: L OFF: High impedance
24	LENS ADRS A	IN	*1
25	LENS ADRS B	IN	*1
26	LENS ADRS C	IN	*1

Pin No	Signal	I/O	Specifications
27	LENS ADRS D	IN	*1
28	EXTENDER 1 ON	OUT	ON: GND OFF: High impedance
29	EXTENDER 2 ON	OUT	ON: GND OFF: High impedance
30	(F DEM FAR)		No connection
31	INCOM 1 ENG/PRD	IN	Zi≥10 kOhms ENG: GND PRD: High impedance
32	INCOM 2 ENG/PRD	IN	Zi ≥ 10 kOhms ENG: GND PRD: High impedance
33	INCOM MIC 1 ON	IN	Zi ≥ 10 kOhms ON: GND OFF: High impedance
34	INCOM MIC 2 ON	IN	Zi ≥ 10 kOhms ON: GND OFF: High impedance
35	(F CONT SIG)		No connection
36	(F DEM NEAR)		No connection

*1 *Zi ≥ 10 kOhns*
1: High impedance
0: 0 +0.5 V
LENS ADRS A (Low-order bit)
LENS ADRS D (High-order bit)
*2 *Zi ≥ 10 kOhms*
1: High impedance
0: 0 ±0.5 V

EXT1	EXT2	EXT3	MODE
1	1	1	EXTENDER OFF
1	0	1	EXT-A (x1.5) ON
0	1	1	EXT-B (x2) ON
0	0	1	EXT-C (x2.5) ON

8-14-1-4 VF (20P, Male) (BKP-9057)



(External view)

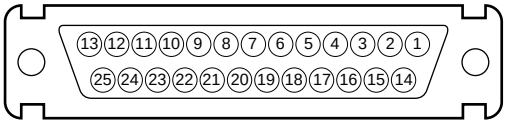
SD video

Pin No	Signal	I/O	Specifications
1	1 (VTR SAVE)		
2	NC		No connection
3	16:9 MODE	IN	H: NORMAL (4:3) L: WIDE (16:9)
4	(REC ALARM)		
5	(COMP/VBS SW IN/OUT)		
6	NC		No connection
7	NC		No connection
8	G TALLY	IN	H: Indicator lights L: Indicator goes out
9	PEAKING OFF	IN	
10	Y (X)	IN	1 V p-p, VF: Zi = 1.5 kOhms
11	NC		No connection
12	VF VIDEO (X)	IN	1.0 V p-p, VF: Zi = 1.5 kOhms
13	(AUDIO CTL)		
14	B-Y (X)	IN	700 mV p-p, VF: Zi = 1.5 kOhms, 75 % color bars
15	R-Y (X)	IN	700 mV p-p, VF: Zi = 1.5 kOhms, 75 % color bars
16	NC		No connection
17	TALLY IND	IN	H: Indicator lights L: Indicator goes out
18	NC		No connection
19	GND	—	GND
20	NC		No connection

HD video

Pin No	Signal	I/O	Specifications
1	S-DATA	IN/ OUT	TTL level
2	NC		No connection
3	NC		No connection
4	SCK	IN	TTL level
5	NC		No connection
6	NC		No connection
7	NC		No connection
8	G TALLY	IN	ON: 5 V OFF: GND
9	NC		No connection
10	NC		No connection
11	NC		No connection
12	VF VIDEO (Y)	IN	VS = 1.0 V p-p, Zi = 75 Ohms
13	VIDEO GND	—	GND for Y VIDEO
14	VF VIDEO (P_B)	IN	0.7 V p-p, Zi = 75 Ohms
15	VF VIDEO (P_R)	IN	0.7 V p-p, Zi = 75 Ohms
16	NC		No connection
17	R TALLY	IN	ON: 5 V OFF: GND
18	NC		No connection
19	UNREG GND	—	GND for UNREG
20	NC		No connection

8-14-1-5 VF (25P, Female) (BKP-9057)



(External view)

SD video

Pin No	Signal	I/O	Specifications
1	VF R VIDEO (X)	OUT	V = 714 mV p-p (NTSC) 700 mV p-p (PAL) Zo = 75 Ohms ± 5 % POSI
2	NC		No connection
3	VF G (X)	OUT	B/W: Y/RET, COLOR: G Zo = 75 Ohms ± 5 % 1 V p-p
4	NC		No connection
5	VF B VIDEO (X)	OUT	V = 714 mV p-p (NTSC) 700 mV p-p (PAL) Zo = 75 Ω ± 5 % POSI
6	RET ON	OUT	ON: GND, OFF: +5 V
7	+12 V (VF)	OUT	+12 V dc
8	+12 V (VF)	OUT	+12 V dc
9	UP TALLY ON	OUT	ON: +12 V OFF: 0 V
10	NC (VF RET VIDEO (X))		No connection (V = 1.0 V p-p Zo = 75 Ohms ± 5 %)
11	R TALLY ON	OUT	ON: 5.0 V ± 0.5 V OFF: 0 +0.5 V
12	VF SEL COL/BW	IN	COLOR:GND B/W: High impedance
13	NC		No connection
14	VF R VIDEO (G)	OUT	GND for VF R VIDEO
15	PEAKING OFF	OUT	OFF: GND ON: High impedance
16	VF G VIDEO (G)	OUT	GND for VF G VIDEO
17	CHASSIS GND	—	CHASSIS GND
18	VF B VIDEO (G)	OUT	GND for VF B VIDEO
19	VF DC GND	—	GND for +12 V (VF)
20	VF DC GND	—	GND for +12 V (VF)
21	TALLY GND	—	GND for TALLY
22	NC (VF RET VIDEO OUT (G))		No connection (GND for VF RET VIDEO)
23	G TALLY ON	OUT	ON: 5.0 V ± 0.5 V OFF: 0 +0.5 V
24	NC		No connection
25	16:9 ON	OUT	ON: GND OFF: High impedance

HD video

Pin No	Signal	I/O	Specifications
1	Y VIDEO	OUT	VS = 1.0 Vp-p, Zo = 75 Ohms
2	P_R VIDEO GND	—	GND for P_R VIDEO
3	P_R VIDEO (X)	OUT	V = 0.7 Vp-p, Zo = 75 Ohms
4	P_B VIDEO GND	—	GND for P_B VIDEO
5	P_B VIDEO (X)	OUT	V = 0.7 Vp-p, Zo = 75 Ohms
6	PEAKING LEVEL	IN	0 to 5 Vdc 0 V: PEAKING OFF 5 V: PEAKING MAX
7	+12 V	OUT	+12 V (at 4 A)
8	+12 V	OUT	+12 V (at 4 A)
9	NC		No connection
10	S-DATA	IN/ OUT	TTL level
11	R TALLY	OUT	ON: +5 V OFF: 0 V
12	NC (EFFECT)		No connection (ON: +5 V OFF: 0 V)
13	NC		No connection
14	Y VIDEO GND	—	GND for Y VIDEO
15	S-CK	OUT	TTL level
16	NC (BATT IND)		No connection (ON: +5 V OFF: 0 V)
17	CHASSIS GND	—	
18	G TALLY	OUT	ON: +5 V OFF: 0 V
19	GND (+12 V)	—	GND for +12 V
20	GND (+12 V)	—	GND for +12 V
21	NC (VF SEL)		No connection (BW: 0 V COLOR: +5 V)
22	NC (H EXPAND)		No connection (EXPAND (4:3): GND NORMAL: +5 V)
23	NC		No connection
24	NC		No connection
25	NC (V EXPAND)		No connection (EXPAND (4:3): GND NORMAL: +5 V)



9 Glossary – Terms and Definitions

9 9-1. Hardware

The following are some technical terms that are frequently used in camera brochures or technical papers.

Adaptive DTL
A simple limiter makes DTL become thick. Adaptive DTL is a very effective function to keep the DTL under a certain level. It was originally developed for anti-aliasing.

Adaptive highlight control
To make the picture look perceptively better -, the picture is divided into several zones along the bright level in which the compression rates of the smaller zones are increased while those of the larger zones are decreased. The Adaptive Highlight Control has been developed for Sony's HDC/BVP-Series, which only applys to the portion whose level is higher than the knee point.

Aspect ratio conversion
Converting 16:9 video signals to 4:3 signals is essential because most of the applications today are 4:3 even though sometimes shot with 16:9 cameras. Sony video cameras for broadcasting and professional use provide the aspect ratio conversion function in combination with a digital filter. Some manufacturers perform this function by changing the reading process of the CCD.

Auto knee/DCC
It is a device that automatically adjusts the knee point and knee slope to raise the dynamic range depending on the pattern of the subject for photography.

Black Gamma
Black Gamma is a function to change the Gamma curve of dark portions of the picture. It also can change the coloring.

Black shading correction
Black shading correction is used to compensate for the irregular black shading which occurs because of the dark current of picture elements and the characteristics of power circuits.

Boost frequency
Horizontal image enhancement is usually performed by raising the space frequency between 3 to 4 MHz. The peak of the frequency raised can be adjusted in order to meet the users' different tastes.

CCD
CCD is the acronym for Charge Coupled Device. It is a kind of semiconductor that converts an optical image into electronic signals - the heart of a camera. After accomplishing the conversion, each pixel (a kind of photoelectric transformer) on the CCD first holds the signal and then transfers it to the next cell. These cells work like a bucket brigade. According to the transfer method, there are two types of CCDs - IT CCD and FIT CCD.

Color bars
Almost all of the video cameras used for broadcasting - have a color bar generator. Although the color bar has been originally developed for the adjustment of an analog encoder, it has become a standard function for professional video camera. Since video cameras are quite often used as a color bar generator, it is still a standard function for a video camera even though the encoder has been digitalized.

Crisp
DTL enhances picture sharpness but at the same time also emphasizes the noise, which makes the picture noisy. Crisp is a circuit that removes small amplitude DTL to improve S/N.

DTL comb filter
The DTL comb filter is used to weaken the oblique DTL that interferes with the sub carrier to generate cross color. However, resolution seems to look bad if the oblique DTL becomes too weak. Some component-dedicated cameras such as HD cameras do not adopt DTL comb filter.

Electronic soft focus
The DTL circuit can make the picture sharper, but it can also shade off the picture by reverting the polarity. When used this way, electronic soft focus is a function to generate a gentle film-like picture. It is more effective to make an announcer's skin color much more lustrous when used in combination with the Skin Tone DTL.

Encoder
Inside the camera, video signals are processed in R/G/B component signals. The encoder is a device used to convert the component signals into composite signals such as NTSC and PAL.

Flare correction
In an optical system, the image might sometimes seem floating or some colors might appear in dark portions of the picture because of diffused reflection. Flare correction electronically compensates for this phenomenon.

Gamma correction
A CRT does not beam at the screen linearly as per the signal level. Normally, a TV set should compensate for the error because it is part of a CRT's characteristics. However, in consideration of the total cost, the industry has reached an agreement with TV stations that the acquisition side should take the responsibility to correct the error. This is the gamma correction. As the standard in this agreement is not very strict, the Gamma correction value is not always completely the same between different manufacturers and different TV stations. In the camera field, Gamma correction is also a way of creating user's taste and setting the picture quality.

Gen lock
Synchronization should be done when using multiple cameras. Gen lock is a function developed for this purpose to synchronize the cameras to an external VBS input. Then, horizontal phase, vertical phase, and sub-carrier phase will be synchronized.

Horizontal image enhancement (H DTL)
Horizontal image enhancement is performed by raising the frequency characteristic of the video signals which is carried out by using the Low Pass Filter and Delay Line for analog cameras while using the digital filter for digital cameras.

Image Enhancement
It is a function to give a perception of a sharper picture or higher resolution. Since the characteristic cannot be

compared in numbers, it does not appear in the specifications of the brochure. However, it is very important for evaluating picture quality intuitively. Usually, it is only called “DTL (detail)”.

IT/FIT
In an IT type CCD, beside the pixels there are columns of cells dedicated for vertical transfer. The electronic signals are transferred from the pixels to the columns of cells during vertical blanking. Finally, the signals reach a row of cells driven by a horizontal block for horizontal transfer, from where the signals are output as video signals. Although there is a cover to protect the cells from light leakage, sometimes the leakage still happens under a strong light, which causes smear.

To avoid this phenomenon, in an FIT type CCD, there is additional storage added to the CCD which enables the vertical transfer to perform much more quickly so to minimize the chance of light leakage even under a strong light. However, this additional storage increases the cost.

Recently, there has been great advances in IT CCD technology and the gap between IT and FIT has been dramatically reduced.

Knee aperture
Contrasts always become worse when compressing in the direction of the bright level during knee correction. Knee aperture is used to improve this point to emphasize the contour to which the knee correction applies.

Knee correction
The dynamic range of a natural scene is very large, but that of a video standard is limited. When we use the iris to adjust for the subject photographically, the bright portion of the picture will become almost completely white. However, when we focus on the bright portion, the subject for photography will become very dark. Knee correction is a function to solve this problem by compressing the level of the bright area to meet that in the video standard so as to make the dynamic range seem larger.

Knee point and knee slope
Knee point is the starting point of the knee correction process, and the knee slope is its compression rate. Usually, knee slope is the peak value under an environment of 200% incident light.

Knee saturation
Because knee correction performs independently in R/G/B channels in a conventional knee circuit, the R/G/B percentage of the portion to which the knee correction applys will change, and thus the color phase and saturation change. This is called “white clip” or “wash out.” Knee saturation is used to balance the coloring to avoid this phenomenon.

Level depend
Just like Crisp reduces noise, level depend is a circuit that decreases the DTL value in dark areas.

Limiter
A limiter is a circuit used to constrain the DTL peak value that may ruin the picture quality when the luminance difference is too big that it will generate too large of a DTL.

Linear matrix
The linear matrix is actually a circuit used to make the color reproduction look better, although some textbooks mention that it is used to correct the difference between camera chromaticity and that of the signal standard. It seems that the linear matrix should be more important to emphasize the visual appeal of the picture apparently rather than just be theoretically determined by some coefficients.

Mix DTL/NAM DTL
Recently, most of the cameras create V DTL from all three channels of R/G/B. Depending on how to apply these three values of V DTL to the add operation, there are two types of mix: the Mix DTL – a simple sum of the values and the NAM DTL – a non-additive mix of the values. Both of them have pros and cons. The Mix DTL is not always better than “out of green”, while the NAM DTL helps make a picture sharper but sometimes it makes the S/N become worse or adds the DTL opposite to the luminance. The NAM DTL does not apply to H DTL, because it will increase aliasing.

Multi matrix
Multi matrix is used to easily implement color reproduction that complies with color matching and visual appeal between different cameras by adjusting the matrix coefficient to match the color phase. For instance, it is possible to change the color phase and saturation of red color only. In most of Sony’s cameras, it works with 16 axes for color phase on a color plane like a vector, each of which has its own matrix coefficient to perform the linearity corrections between each axis. Normally, each axis needs six matrix coefficients (that means 96 matrix coefficients are needed). However, the number of coefficients can be reduced to two for each axis in most of Sony’s cameras using some dedicated software - color phase and saturation.

On-chip-lens
To obtain a better quality picture, -the more pixels the better for a CCD. However, increasing the number of pixels means decreasing the pixel size. When the pixel size becomes smaller, less incident light can be gathered, which degrades the sensitivity. The on-chip-lens is a micro lens put on each pixel to help increase light gathering so to improve the sensitivity.

Optical filter
There are two types of optical filters, Neutral Density (ND) filter and Color Temperature Conversion (CC) filter. The former is like a pair of sunglasses for the camera to avoid the iris to be stopped down too much under a very strong light, while the latter works like a pair of colored glasses to compensate for the color temperature beyond the white balance compensation range. Both of them are integrated on a built-in filter disk, can be manually or electronically controlled and can be remotely controlled using the remote controller for the electronic filter.

Optical low pass filter
Shooting with a CCD camera means sampling a picture via the use of the pixels on a CCD. An optical low pass filter is made of optical crystal to cut off the unnecessary high frequency that might cause beat interference caused by the relation between the number of pixels and the pattern of the shooting subject during the sampling.

Out of green
The older version cameras create V DTL from the G channel and add it to each channel to carry out image enhancement. This method helps use a less number of delay lines, but does not perform well in some cases such as a deep red flower picture. Some cameras create V DTL from R/G channels.

Pedestal/Master black
It is the black level. If the pedestal level is too high, the whole picture will become a little bit white.

Prism block for color separation
A prism block that breaks down sunlight into red, green, and blue - the three element colors for a video image - is an essential component for a CCD camera.

Skin tone DTL
Skin tone DTL is a function that changes the DTL value by color. It was originally designed to make an announcer's face more lustrous by reducing the DTL on his/her face. It is also a useful function for intentionally emphasizing certain scenes such as the surface of a lawn.

System conversion
In addition to HD output, NTSC and PAL outputs are also necessary for HD cameras. For that, the CCU uses a down converter.

Vertical image enhancement (V DTL)
Vertical image enhancement is performed by enhancing the difference between vertical picture elements using a 2H delay line.

White balance
White balance is used to compensate for the color temperature of the subject for photography. Contrarily, a sunset scene can be taken even in the daytime by using the white balance adjustment.

White clip/Black clip
The range between black level and the maximum white level is fixed in video signal standards. The white clip and black clip are the circuits used to prevent video signals from exceeding this range.

White shading correction
Because irregular shading happens during light-to-current inversion in a CCD, sensitivity becomes uneven on the screen. It is not so conspicuous for a one-chip camera, but for a three-chip camera sometimes the color may not be completely the same depending on the portion of the screen. White shading correction is used to avoid this phenomenon that is also called modulation shading.

9-2. Software

Software plays an important role in cameras today. It is not too strong to say that a camera without software is just like a body without a brain. Usually, software is integrated into switches for internal setting or for communications with other devices. The following are some technical terms we frequently use in this field.

Auto black balance (ABB)
Auto black balance automatically adjusts the black level to prevent coloring other than black, which occurs while the lens is closed. Sometimes, black set is also carried out at the same time. Some CCD cameras use APR (Automatic Pixel Restoration) to perform auto black balance for convenience.

Auto Iris
Auto iris is a function that automatically controls the aperture (lens opening) based on the mean or the peak value of video signals.

Auto set up
Auto set up is a function for camera automatic adjustment which can be divided into Auto White Balance (AWB), Auto Tracing White (ATW), Auto Black Balance (ABB), Level Auto Setup, Auto White Shading, Auto Black Shading, etc.

Auto tracing white (ATW)
It is a convenient function for low-end or consumer type cameras, which automatically keeps adjusting the white balance during shooting. However, most of the cameras used for broadcast applications do not adopt this method because the white balance is not very precise and the ongoing changing of color temperature is not usually a variable to consider because scenes are staged and controlled.

Auto white balance (AWB)
Auto white balance automatically adjusts color temperature when shooting a white subject.

Auto white shading/Auto black shading
Both of them automatically adjust the shading. Auto black shading is simply carried out when the lens is closed. However, in the strict sense of the word, a complete white subject for photography is needed for auto white shading, in which there are two modes - one keeps each of the R/G/B waves flat and the other matches them to the G-channel.

File system
Increasing camera functions also expands the number of its setting items. In order to improve the operability and make it easy, setting and correction information are stored in the files in the camera, while the reference and scene files are stored on a memory card.

Lens file
Lenses of the cameras for broadcasting use are often changed to meet different shooting environments. Since each lens has its own characteristic, individual settings and adjustments have to be done every time the lens is changed. In order to improve the operability, a lens file is developed to store the setting data that can be recalled so to skip over the process of setting and adjustment to save time.

Level auto set up
Level auto set up is a function that automatically keeps adjusting the camera to a standard setting, e.g. automatically adjusting gamma, knee, etc.

Pattern auto iris
Pattern auto iris is used to emphasize auto iris on certain portions of the screen, e.g. granting priority to the center portion, cutting the upper portion, or emphasizing the center.

Reference file
A reference file is a place to store setting data for normal status that varies depending on the user's individual settings. The data is also the target value for "level auto set up" including not only the analog control data but also the digital file data for switch settings.

Scene file
A scene file is a place to temporally store the data that differs from the normal settings. For instance, a camera setting data made during rehearsal can be stored in a scene file and then be recalled during an actual take.

9-3. Camera characteristics

Most of the camera characteristics cannot just be determined by numbers. Good values do not always equal good picture quality. Judging by human eyes is one of the most important processes to evaluate a camera. The following are a few technical terms to be familiar with:

Modulation depth
Modulation depth is used to measure a camera's fundamental performance. It shows a video level percentage of a 0.5 MHz pulse wave in a subject so that the 0.5 MHz pulse wave video level is 100% as black to white, by shooting a Multi Burst chart while Detail, Gamma, Matrix and Knee are off. The camera's performance is calculated by measuring the 0.5 MHz response in the actual video bandwidth. Usually, the frequency characteristics of the amplifier should be kept flat, because if the level is raised too high, aliasing noise will increase and the S/N becomes worse. In actual shooting, picture quality is adjusted by adding Detail signals to enhance the response.

Power consumption and heating
Power consumption is a factor that develops heat, which is critical for shoulder-operating production cameras although it is a little bit relaxed for studio cameras. Using a cooling fan to reduce heating is not a good solution, because the camera operator can hear this noise. So, low power consumption is an essential factor.

Reliability
Reliability is one of the most important factors when we evaluate a camera. Unlike other broadcasting equipment, cameras are often used outside under severe circumstances such as live broadcasting of skiing events below the freezing point or live broadcasting of baseball in mid-summer, where reliability always has first priority and a camera malfunction is not acceptable.

Resolution
When we are talking about camera resolution, it usually means horizontal resolution. It is calculated on how many black and white lines that you can see horizontally in a subject to that of the black and white lines counted independently. For instance, a black line and a white line are counted as two lines. When it is converted to vertical resolution, because the definition is how many lines can be seen vertically, it should be revised with the aspect ratio. Therefore, even though the horizontal pixel number is the same; resolution of 4:3 is better than that of 16:9.

Since the video signals of most of the cameras are processed digitally, the resolution limit is fixed; this is why the modulation depth has become to be regarded as more important.

S/N (signal-to-noise ratio), Sensitivity and dynamic range
When we are talking about camera S/N, it usually means the S/N of black. The black level is amplified by gamma and its gain greatly affects the S/N, which vary between different manufacturers and even - different models from the same manufacturer. Of course, users also have different tastes. S/N is also changed by different DTL settings. Usually, it is measured when IRIS is closed, gamma is off, DTL is off, Chroma is off, and the pedestal level is set at 5%.

There is a close relationship between S/N, sensitivity, and dynamic range. When we raise the sensitivity, the S/N and dynamic range will decrease. So, it is difficult to decide to emphasize which item while the other two items will be affected. Although the measured value of the S/N is important, it seems that the S/N judged by human eyes after gamma and DTL are set is more important.

Weight and balance
Very naturally, less weight is better for shoulder-operated equipment. However, balance is also a very important factor. If the camera weight is too low, then the overall balance of the camera will be off when a large lens is attached.



10 Specifications

10 10-1. HDC-900, HD Color Video Camera

General

Operating temperature	–20°C to +45°C (–4°F to 113°F)
Storage temperature	–20°C to +50°C (–4°F to 122°F)
Mass Approx.	21 kg (46 lb 5 oz) (main unit only)
Dimensions (Unit: mm/inches)	See below

Imager

Imager	2/3-type frame interline transfer CCD
Method	3-CCD, RGB
Effective resolution	1920 (horizontal) × 1080 (vertical)

Optical system specifications

Spectral system	f1.4 prism
Built-in filters	Color temperature conversion filters A: cross filter B: 3200K (clear) C: 4300K D: 6300K E: 8000K ND filters 1: clear 2: 1/4 ND 3: 1/8 ND 4: 1/16 ND 5: 1/64 ND
Servo filter control	Yes
Lens mount	Sony hanger mount

Electrical characteristics

Sensitivity	F10.0 (at 2000 lx with 89.9% reflectivity)
Minimum illumination	10 lux (F 1.4, +12 dB gain up)
Image signal-to-noise ratio	54 dB or more (typical)
Horizontal resolution	1000 TV lines
Dynamic range (1080/60i mode)	600 %
Registration	Within 0.02 % (all zones, without lens)
Shutter speed selection (1080/60i)	1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s)
Gain selection	–3, 0, +3, +6, +12 dB
Clear Scan selection	60.1 to 4300 Hz
Extended Clear Scan	30.3 to 58.3 Hz
Modulation depth	45 % or more horizontally (800 TV lines at center, 27.5 MHz, with typical lens)
Smear level (typical)	–135 dB
Frequency response	Within ±0.5 dB, 10 to 25 MHz Within ±1.0 dB, 25 to 30 MHz
Horizontal resolution	1000 TV lines (at center of screen) 45 +10, –5% (27.5 MHz)
Geometric distortion	Negligible (not including lens distortion)

Input connectors

DC IN	4-pin (1)
RET CONTROL	6-pin (1)
AUDIO IN CH-1, CH-2	XLR 3-pin, male (1 each) For MIC: –60 dBs (may be selected to –20 dBs by viewfinder menu or HDCU-900 operations), balanced For LINE: –20 dBs, balanced

Output connectors

TEST OUT	BNC type (1) 1.0 Vp-p, 75-ohm terminated
PROMPTER	BNC type (1) 1.0 Vp-p, 75-ohm terminated
AC OUT	100 V AC (1)
HD SERIAL OUT	1.5 Gbps (1)
VF	D-sub 25-pin (1)
DC OUT	4-pin (1) DC 12 V, 5 W

Input/output connectors

CCU	Electro-optical connector (1)
VTR	26-pin (1)
TRACKER	20-pin (1)
REMOTE	8-pin multi-connector (1)
INTERCOM 1 and 2	XLR 5-pin (1 each)

Supplied accessories

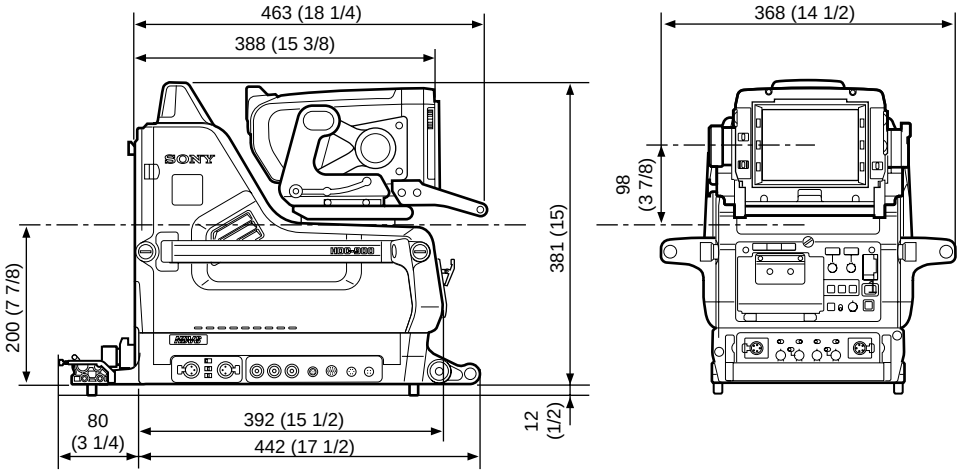
Angle adjustment brackets (2)
Front cover (1)
Number plates
- for up tally (1 set)
- for side panel (2 sets)
- for back tally (1 set)

Cable clamp (2)
Operation manual (1)
Installation & maintenance manual (1)

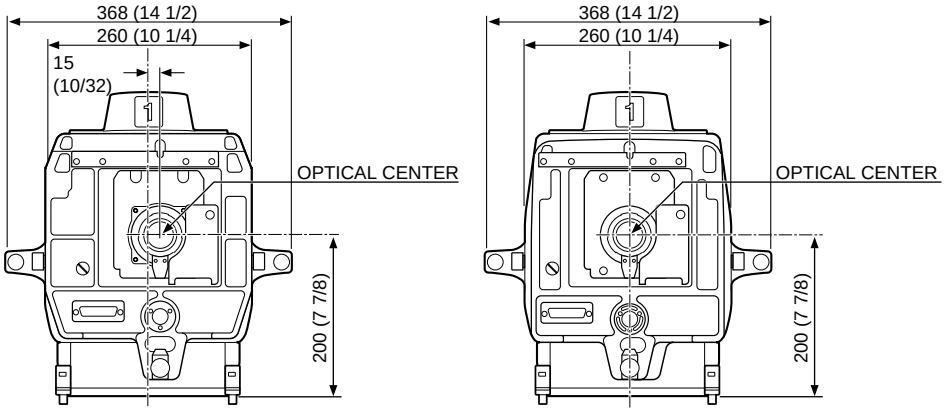
Optional accessories

HDVF-700A HD Electronic Viewfinder (7-type, monochrome)
HDVF-C700W HD Electronic Viewfinder (6-type, color)
VFH-770 Outdoor Hood
BKP-7911 Script Holder (with script light)
CAC-6 Return Video Selector
Maintenance manual CD-ROM version

Dimensions Unit: mm(inches)



Dimensions Unit: mm(inches)



10-2. HDC-950, HD Color Video Camera

General

Power consumption	25W (in stand-alone use, without options)
Operating temperature	–20° C to +45° C (–4° F to +113° F)
Storage temperature	–20° C to +50° C (–4° F to +122° F)
Mass Approx.	5.1 kg (112 lb 7 oz)
Dimensions (Unit: mm/inches)	See below

Imager

Imager	2/3-type frame interline transfer CCD
Method	3-CCD, RGB
Effective resolution	1920 (horizontal) × 1080 (vertical)

Electrical characteristics

Sensitivity	F10.0 (at 2000 lx with 89.9% reflectivity)
Minimum illumination	10 lux (F 1.4, +12 dB gain up)
Image signal-to-noise ratio	54 dB or more (typical)
Horizontal resolution	1000 TV lines
Dynamic range (1080/60i mode)	600 %
Registration	Within 0.02 % (all zones, without lens)
Shutter speed selection (1080/60i)	1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s)
Gain selection	–3, 0, +3, +6, +12 dB
Clear Scan selection	60.1 to 4300 Hz
Extended Clear Scan	30.3 to 58.3 Hz
Modulation depth	45 % or more horizontally (800 TV lines at center, 27.5 MHz, with typical lens)
Smear level (typical)	–135 dB
Frequency response	Within ±0.5 dB, 10 to 25 MHz Within ±1.0 dB, 25 to 30 MHz
Horizontal resolution	1000 TV lines (at center of screen) 45 +10, –5% (27.5 MHz)
Geometric distortion	Negligible (not including lens distortion)

Optical system specifications

Spectral system	F1.4 prism
Built-in filters	Color temperature conversion filters A: cross filter B: 3200K (clear) C: 4300K D: 6300K E: 8000K ND filters 1: clear 2: 1/4 ND 3: 1/8 ND 4: 1/16 ND 5: 1/64 ND
Servo filter control	Yes
Lens mount	Sony bayonet mount
Laser Diode Properties	
Material:	InGaAsP
Wave length:	1310 ±40 nm
Emission duration:	Continuous
Laser output power:	141 +37 –19 mW

Input/output connectors

VTR	CCZ, 26-pin (1)
CCU	Electro-multi connector (1)
LENS	12-pin (1)
VF	20-pin (1)
MIC IN	XLR 3-pin, female (1)
AUDIO IN 1, 2	XLR 3-pin, female (1)
EARPHONE OUT	Minijack (1), 8 ohms
DC IN	XLR 4-pin (1), 10.5 to 17 V DC
DC OUT	4-pin (1), 10.5 to 17 V DC, 5W maximum
HD SERIAL OUT	BNC type (1)
INCOM1 and 2	XLR 5-pin, female (1)
TEST OUT	BNC type (1)
GENLOCK IN/RET IN/PROMPT OUT	BNC type (1), 1 Vp-p, 75 ohms
RET CONT	6-pin (1)
REMOTE	8-pin (1)
TRACKER	20-pin (1)
EXT I/O	20-pin (1)

Supplied accessories

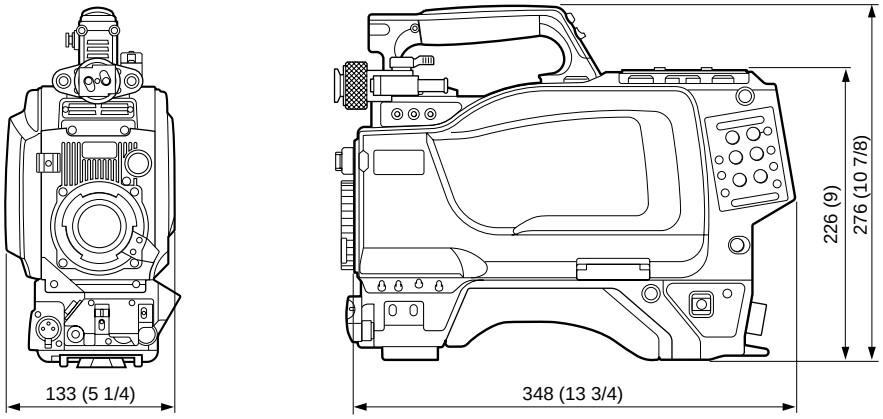
Operation manual (1)
Installation & maintenance manual (1)

Optional accessories

BKP-L551 Battery Adaptor
BKW-401 Viewfinder Rotation Bracket
C-74 Microphone
CA-905L Large Lens Adaptor
CAC-6 Return Video Selector
CAC-12 Microphone holder
HDVF-20A HD Electronic Viewfinder
HDVF-C750W HD Electronic Viewfinder
MSA-4A/8A/16A Memory Stick
VCT-14 Tripod adaptor
Maintenance manual CD-ROM version

Design and specifications are subject to change without notice.

Dimensions Unit: mm (inches)



10-3. HDC-930, HD Color Video Camera

General

Power consumption	25W (in stand-alone use, without options)
Operating temperature	–20° C to +45° C (–4° F to +113° F)
Storage temperature	–20° C to +50° C (–4° F to +122° F)
Mass Approx.	5.1 kg (112 lb 7 oz)
Dimensions (Unit: mm/inches)	See below

Imager

Imager	2/3-type interline transfer CCD
Method	3-CCD, RGB
Effective resolution	1920 (horizontal) × 1080 (vertical)

Electrical characteristics

Sensitivity	F10.0 (at 2000 lx with 89.9% reflectivity)
Minimum illumination	10 lux (F 1.4, +12 dB gain up)
Image signal-to-noise ratio	54 dB or more (typical)

Horizontal resolution	1000 TV lines
Dynamic range (1080/60i mode)	600 %
Registration	Within 0.02 % (all zones, without lens)
Shutter speed selection (1080/60i)	1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s)
Gain selection	–3, 0, +3, +6, +12 dB
Clear Scan selection	60.1 to 4300 Hz
Modulation depth	45 % or more horizontally (800 TV lines at center, 27.5 MHz, with typical lens)
Smear level (typical)	–125 dB
Frequency response	Within ±0.5 dB, 10 to 25 MHz Within ±1.0 dB, 25 to 30 MHz
Horizontal resolution	1000 TV lines (at center of screen) 45 +10, –5% (27.5 MHz)
Geometric distortion	Negligible (not including lens distortion)

Optical system specifications

Spectral system	F1.4 prism
Built-in filters	Color temperature conversion filters A: cross filter B: 3200K (clear) C: 4300K D: 6300K E: 8000K ND filters 1: clear 2: 1/4 ND 3: 1/8 ND 4: 1/16 ND 5: 1/64 ND
Servo filter control	Yes Lens mountSony bayonet mount
Laser Diode Properties	
Material:	InGaAsP
Wave length:	1310 ±40 nm
Emission duration:	Continuous
Laser output power:	141 +37 –19 mW

Input/output connectors

VTR	CCZ, 26-pin (1)
CCU	Electro-multi connector (1)
LENS	12-pin (1)
VF	20-pin (1)
MIC IN	XLR 3-pin, female (1)
AUDIO IN 1, 2	XLR 3-pin, female (1)
EARPHONE OUT	Minijack (1), 8 ohms
DC IN	XLR 4-pin (1), 10.5 to 17 V DC
DC OUT	4-pin (1), 10.5 to 17 V DC, 5W maximum
HD SERIAL OUT	BNC type (1)
INCOM1 and 2	XLR 5-pin, female (1)
TEST OUT	BNC type (1)
GENLOCK IN/RET IN/PROMPT OUT	BNC type (1), 1 Vp-p, 75 ohms
RET CONT	6-pin (1)
REMOTE	8-pin (1)
TRACKER	20-pin (1)
EXT I/O	20-pin (1)

Supplied accessories

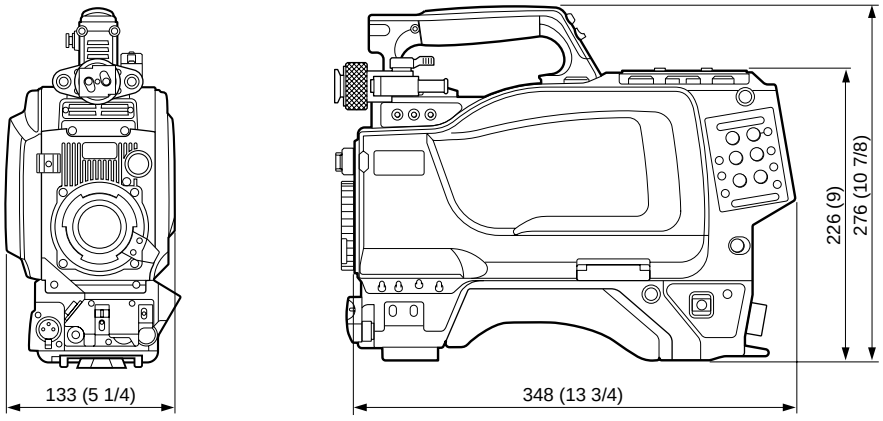
Operation manual (1)
Installation & maintenance manual (1)

Optional accessories

BKP-L551 Battery Adaptor
BKW-401 Viewfinder Rotation Bracket
C-74 Microphone
CA-905L Large Lens Adaptor
CAC-6 Return Video Selector
CAC-12 Microphone holder
HDVF-20A HD Electronic Viewfinder
HDVF-C750W HD Electronic Viewfinder
MSA-4A/8A/16A Memory Stick
VCT-14 Tripod adaptor
Maintenance manual CD-ROM version

Design and specifications are subject to change without notice.

Dimensions Unit: mm (inches)



10-4. HDCU-900, HD Camera Control Unit

General

Power supply	100/110-120/220-240 V AC, 50/60 Hz
Current consumption	5.4 A (at 100 V AC, entire system active)
Peak inrush current	(1) Power ON, current probe method: 80 A (240 V), 80 A (100 V) (2) Hot switching inrush current, measured in accordance with European standard EN55103-1: 10 A (230 V)
Operating temperature	5°C to 40°C (41°F to 104°F)
Storage temperature	–20°C to +60°C (–4°F to +140°F)
Mass Approx.	20 kg (44 lb 1 oz)
Dimensions (Unit: mm/inches)	See below

Input/Output connectors

CAMERA	Optical fiber connector (1) 1.485 Gbps/1.4835 Gbps SDI' 2, 240 V AC power supply
INCOM/TALLY/PGM	D-sub 25-pin (1) • INCOM-4W, 2 systems (PD /ENG), 0 dB • PGM, 2 systems, 0 / –20 dB • TALLY (R, G)
RCP/CNU REMOTE	8-pin multi-connector (1)
TRUNK LINE	D-sub 9-pin, female (1) RS-232C, for CHU transmission or system expansion
I/O PORT	D-sub 15-pin, female (1) (JAE-made DA-C1-J10 recommended)

Input connectors

AC IN	100, 110 to 120, 220 to 240 V AC switchable
HD SERIAL RET INPUT	BNC type (4), SMPTE-292M, Bit rate: 1.485 Gbps/ 1.4835 Gbps
SD SERIAL RET INPUT	BNC type (4), SMPTE-259M Bit rate: 270 Mbps
REFERENCE INPUT	BNC type (2), loop-through output HD: SMPTE-274M, tri-level sync, 0.6 Vp-p, 75 ohms SD: Black burst (or 10F-BB), 0.286 Vp-p, 75 ohms (NTSC) 0.3 Vp-p, 75 ohms (PAL)
PROMPTER IN	BNC type (2), loop-through output, analog signal, 1.0 Vp-p, 75 ohms
MIC REMOTE	D-sub 15-pin (1) (JAE-made DAC1-J10 recommended)

Output connectors

MIC OUT	XLR 3-pin, male (2), 0 dBs/ –20 dBs
DIGITAL AUDIO OUT	BNC type (1), AES/EBU format
CHARACTER OUT	BNC type (1), 525/625 black and white
WF REMOTE	D-sub 15-pin, female (1) (JAEmade DA-C1-J10 recommended)
HD SERIAL OUTPUT	BNC type (3) SMPTE-292M, 0.8 Vp-p, 75 ohms, Bit rate: 1.485 Gbps/ 1.4835 Gbps
HD SERIAL MONI OUTPUT	BNC type (1), SMPTE-292M, 0.8 Vp-p, 75 ohms Bit rate: 1.485 Gbps/ 1.4835 Gbps
SD SERIAL OUTPUT	BNC type (4), SMPTE-259M, 0.8 Vp-p, 75 ohms Bit rate: 270 Mbps
SYNC OUT	BNC type (1) HD: BTA S001A, tri-level sync, 0.6 Vp-p, 75 ohms SD: composite sync, 0.3 Vp-p, 75 ohms HD SYNC or SD SYNC selectable
PIX OUT	BNC type (1), VBS/R/G/B (VBS 1 Vp-p, 75 ohms)
WF OUT	BNC type (1), VBS/R/G/B (VBS 1 Vp-p, 75 ohms)
WF MODE	4-pin (1)

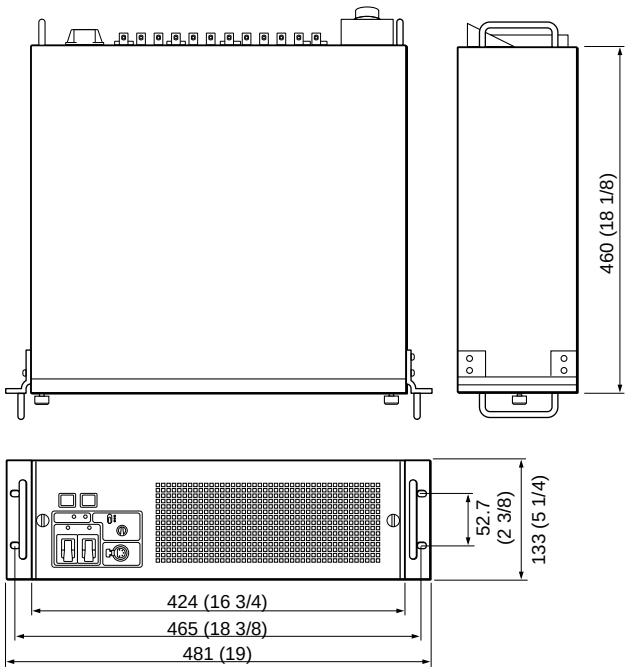
Supplied accessories

AC power cord (1)
Power cord plug holder (1)
2-pin/3-pin transformer AC plug (1)
4-pin connector (1)
Number plates (1 set)
Fuses (1 set)
Operation manual (1)
Maintenance manual Part 1 (1)

Optional accessories

HKCU-901 SD Analog Interface Unit
HKCU-902 HD Analog Interface Unit
HKCU-903 Frame Rate Converter Unit
HKCU-904 Line Converter Unit
CCA-5-3 Connection Cable (3 meter/10 feet)
CCA-5-10 Connection Cable (10 meter/33 feet)
Maintenance manual Part 2

Dimensions Unit: mm (inches)



10-5.HDCU-950, HD Camera Control Unit

General

Power supply	100 to 240 V AC, 50/60 Hz
Current consumption	3.6 A max.
Standby power Approx.	5 W
Peak inrush current	(1) Power ON, current probe method: 30A (240V), 8A (100V) (2) Hot switching inrush current, measured in accordance with European standard EN55103-1: 26A (230V)
Operating temperature	–10°C to +40°C (+14°F to +104°F)
Storage temperature	–20°C to +50°C (–4°F to +122°F)
Mass Approx.	6.5 kg (14 lb 5 oz)
Dimensions (Unit: mm/inches)	See below

Input/output connectors

CAMERA	Optical fiber connector (1) 1.485 Gbps/1.4835 Gbps SDI × 2, 180 V DC power supply
INCOM/TALLY/PGM	D-sub 25-pin (1) • INCOM-4W, 2 systems (PD /ENG), 0 dB • PGM, 2 systems, 0 dB/ –20 dB • TALLY (R, G)
RCP/CNU	8-pin multi-connector (1)

Input connectors

AC IN	100 to 240 V AC
RET 1/2/3	BNC type (3), VBS: 1.0 Vp-p, 75 ohms
REFERENCE	BNC type (2), loop-through output HD: SMPTE-274M, tri-level sync, 0.6 Vp-p, 75 ohms SD: Black burst (NTSC: 0.286 Vp-p, 75 ohms) (PAL: 0.3 Vp-p, 75 ohms) or NTSC 10F-BB
PROMPTER	BNC type (2), loop-through output, analog signal, 1.0 Vp-p, 75 ohms
MIC REMOTE	D-sub 15-pin (1) (JAE-made DAC1-J10 recommended) (switchable to WF REMOTE by an internal setting)

Output connectors

MIC	XLR 3-pin, male (2),0 dBu/ –20 dBu
HD SDI OUT	BNC type (2), SMPTE-292M, 0.8 Vp-p, 75 ohms, 1.485 Gbps/1.4835 Gbps
SD SDI OUT	BNC type (2), SMPTE-259M, 0.8 Vp-p, 75 ohms, 270 Mbps
MONI (HD SDI)	BNC type (1), 0.8 Vp-p, 75 ohms, 1.485 Gbps/1.4835 Gbps

SYNC OUT	BNC type (1) HD: BTA S001A, tri-level sync, 0.6 Vp-p, 75 ohms SD: composite sync, 0.3 Vp-p, 75 ohms HD SYNC or SD SYNC selectable
PIX OUT	BNC type (1), VBS/R/G/B (VBS 1 Vp-p, 75 ohms)
WF OUT	BNC type (1), VBS/R/G/B (VBS 1 Vp-p, 75 ohms)
WF MODE	4-pin (1)

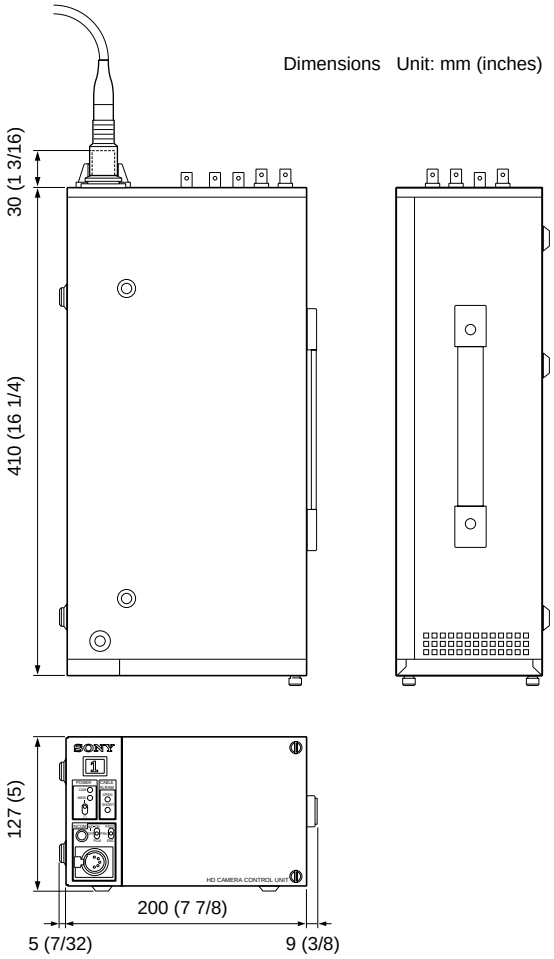
Supplied accessories

4-pin connector (1)
Number plates (1 set)
Operation manual (1)
Installation and maintenance manual (1)

Optional accessories

AC power cord:
USA and Canada: 1-551-812-XX
Other countries: 1-782-929-XX
Power cord plug holder:
USA and Canada: 2-990-242-01
Other countries: 3-613-640-01
HKCU-951 SD Encoder Unit
HKCU-953 HD Frame Rate Converter Unit
CCA-5-3 Connection Cable (3 meter/10 feet)
CCA-5-10 Connection Cable (10 meter/33 feet)
RMM-301 Rack Mount Adaptor
Expansion Board

Dimensions Unit: mm (inches)



10-6. CNU-700, Camera Command Network Unit

General

Power requirements	For United States: 100 to 120 VAC, 50/60 Hz For other countries: 220 to 240 VAC, 50/60 Hz
Current consumption	Max.4.0 A
Operating temperature	0°C to +45°C (+32°F to +113°F)
Dimensions	424 (W) × 132 (H) × 400 (D) mm (16 3/4 × 5 1/4 × 15 3/4 inches)
Mass	9.5 kg (20 lb 15 oz)

Input and output connectors

CCU 1 through 6	8-pin multi-connector (1 each)
RCP 1 through 6	8-pin multi-connector (1 each)
MSU	8-pin multi-connector (1)
VCS	8-pin multi-connector (1)
AUX 1 and 2	8-pin multi-connector (1 each)
CHARACTER	BNC type (2), video: 0.7 Vp-p, sync: 0.3 Vp-p
REFERENCE	BNC type (2), 0.3 Vp-p with loop-through output
RS232C	D-sub 9-pin
AC IN	3-pin (1)

Supplied accessories

AC power cord x1
Plug holder for the AC power cord x1
Operation manual x1
Maintenance manual x1

10-7. CNU-500, Camera Command Network Unit

General

Power requirements	For United States: 100 to 120 VAC, 50/60 Hz For other countries: 220 to 240 VAC, 50/60 Hz
Current consumption	Max.4.0 A
Operating temperature	5°C to +45°C (+41°F to +113°F)
Dimensions	424 (W) × 45 (H) × 400 (D) mm (16 3/4 × 1 3/4 × 15 3/4 inches)
Mass	7 kg (15 lb 7 oz)

Input and output connectors

CCU 1 through 6	8-pin multi-connector (1 each)
RCP 1 through 6	8-pin multi-connector (1 each)
MSU	8-pin multi-connector (1)
VCS	8-pin multi-connector (1)
AUX 1 and 2	8-pin multi-connector (1 each)
CHARACTER	BNC type (2), video: 0.7 Vp-p, sync: 0.3 Vp-p
REFERENCE	BNC type (2), 0.3 Vp-p with loop-through output
RS232C	D-sub 9-pin
AC IN	3-pin (1)

Supplied accessories

AC power cord x1
Plug holder for the AC power cord x1
Operation manual x1
Maintenance manual x1

10-8. VCS-700, Video selector

General

Power requirements	In United States: 100 to 120 VAC, 50/60 Hz In other countries: 220 to 240VAC, 50/60 Hz
Current consumption	For USA and Canada: Max 0.28A For other countries: Max.0.28 A
Operating temperature	0°C to +45°C (+32°F to +113°F)
Dimensions	424 (W) × 44 (H) × 400 (D) mm (16 3/4 × 1 3/4 × 15 3/4 inches)
Mass	5.2 kg (11 lb 7 oz)

Input Connectors

PIX 1 to PIX 6 INPUT	BNC type (6), 1.0 Vp-p (VBS), 75 ohms
WF 1to WF 6 INPUT	BNC type (6), For USA and Canada: 1.0 Vp-p (VBS)/0.714 Vp-p (V), 75 ohms For other countries: 1.0 Vp-p (VBS)/0.7 Vp-p (V), 75 ohms
PIX A INPUT	BNC type (1), 1.0 Vp-p (VBS), 75 ohms
WF A INPUT	BNC type (1), 1.0 Vp-p (VBS), 75 ohms
CHARACTER INPUT	BNC type (1, with loop-through output), 0.7 Vp-p (V), 75 ohms
AC IN	3-pin (1)

Output connectors

PIX A and PIX B OUTPUT	BNC type (1 each), 1.0 Vp-p (VBS), 75 ohms
WF A and WF B OUTUT	For USA and Canada: 1.0 Vp-p (VBS)/0.7 Vp-p (V), 75 ohms For other countries: 1.0 Vp-p (VBS)/ 0.7 Vp-p (V), 75 ohms

SYNC OUTPUT	BNC type (1), 0.3 Vp-p (VBS), 75 ohms, negative polarity
WF MODE	Round 4-pin connector (1)

Remote connectors

REMOTE	8-pin multi-connector (1)
I/O PORT	D-sub 37-pin (1)

Supplied accessories

AC power cord x1
Plug holder for the AC power cord x1
4-pin connector x1
Operation manual x1
Maintenance manual x1

10-9. MSU-700A, Master Setup Unit

General

Power requirements	100 to 240 V AC, 50/60 Hz
Current consumption	0.45 A
Peak inrush current	(1) Power ON, current probe method: 20A(100V), 55A (240V) (2) Hot switching inrush current, measured in accordance with European standard EN55103-1: 12A (230V)
Operating temperature	0°C to 45°C (32°F to 113°F)
Maximum cable length	200 m (656 feet)
Dimensions (w/h/d)	482 × 222 × 67 mm (19 × 83/4 × 23/4 inches) including projecting parts and controls
Mass	Approx. 4.5 kg (9 lb 15 oz)

Inputs/outputs

REMOTE	
CCU/CNU	8-pin multi connector (1)
AUX	8-pin multi connector (1)
I/O PORT	50-pin (1)
AC IN	3-pin (1)

Supplied accessories

Operation Manual (1)
Maintenance Manual Part 1 (1)
Button labels for HD system (1 set)

Optional accessories

AC power cord

10-10. MSU-750, Master Setup Unit

General

Power requirements	100 to 240 V AC, 50/60 Hz
Current consumption	0.4 A
Peak inrush current	(1) Power ON, current probe method: 30A(100V), 60A (240V) (2) Hot switching inrush current, measured in accordance with European standard EN55103-1: 14A (230V)
Operating temperature	0°C to 45°C (32°F to 113°F)
Maximum cable length	200 m (656 feet)
Dimensions (w/h/d)	204 × 354 × 67 mm (81/8 × 14 × 23/4 inches) including projecting parts and controls
Mass	Approx. 3.5 kg (7 lb 11 oz)

Inputs/outputs

REMOTE	
CCU/CNU	8-pin multi connector (1)
AUX	8-pin multi connector (1)
AC IN	3-pin (1)

Supplied accessories

Operation Manual (1)
Maintenance Manual Part 1 (1)

Optional accessories

AC power cord

10-11. RCP-750/751, Remote Control Panel

General

Power requirements	10.5 to 35 V DC
Power consumption	4 W max.
Maximum cable length	200 m (656 feet) with CCU/HDCU connected
Operating temperature	5°C to 40°C (41°F to 104°F)
Dimensions (w/h/d)	RCP-750: 102 × 354 × 126.5 mm (4 1/8 × 14 × 5 inches) RCP-751: 102 × 354 × 86.5 mm (4 1/8 × 14 × 31/2 inches)
Mass	RCP-750: 1.5 kg (3 lb 5 oz) RCP-751: 1.3 kg (2 lb 14 oz)

Inputs/outputs

REMOTE	CCU/CNU: 8-pin multi connector (1) AUX: 8-pin multi connector (1)
EXT I/O	9-pin D-sub connector (1)

Supplied accessory

Operation Manual (1)

Optional accessories

Remote cable CCA-5-3 (3 m)
Remote cable CCA-5-10 (10 m)
Remote cable CCA-5-30 (30 m)
Maintenance Manual
Memory Stick

10-12. RCP-700/701, Remote Control Panel

Connectors

REMOTE	CCU/CNU: 8-Pin PREVIEW: 8-Pin I/O port: 29-pin
Power requirements	30 VDC
Mass	RCP-700: 1.0 kg (2 lb 3 oz) RCP-701: 0.9 kg (2 lb)
Dimensions	RCP-700: 68 (W) × 221 (H) × 127 (D) mm (2 3/4 × 8 3/4 × 5 inches) RCP-701: 68 (W) × 221 (H) × 83 (D) mm (2 3/4 × 8 3/4 × 3 3/8 inches)

10-13. RM-B150 (front panel), Hand-held Remote Control Unit

General

Power Requirements	DC 10.5 – 30 V (max) (supplied from camera/camcorder/CCU
Operating Temperature	–20°C to +45°C
Storage Temperature	–20°C to +55°C
Dimensions (W × H × D)	86 mm × 65 mm × 179 mm (3 1/2 × 2 5/8 × 7 1/8 inches)
Mass	Approx. 0.7 kg (1 lb 9 oz)

Inputs

Control interface	8-pin (x 1), Sony Camera Command Network Protocol
Monitor in	BNC type (x 1) VBS (No HD signal capable)

10-14. RM-B750 (front panel), Hand-held Remote Control Unit

General

Power Requirements	DC 10.5 – 30 V (max) (supplied from camera/camcorder/CCU
Operating Temperature	+5°C to +40°C
Storage Temperature	–20°C to +55°C
Dimensions (W × H × D)	197 mm × 62 mm × 124 mm (7 7/8 × 2 1/2 × 5 inches)
Mass	Approx. 0.7 kg (1 lb 9 oz)

Inputs

Control interface	8-pin (x 1), Sony Camera Command Network Protocol
Monitor in	BNC type (x 1) VBS (No HD signal capable)

10-15. HDVF-20A, HD Electronic Viewfinder

General

Power requirements	10.5 to 17 V DC
Power consumption	4 W
Operating temperature	–20°C to +45° C (–4°F to +113°F)
Storage temperature	–20°C to +50°C (–4°F to 122°F)
External dimensions	239 × 76 × 210 mm (9 1/2 × 3 × 8 3/8 inches) (w/h/d)
Mass	600 g (1 lb 5 oz)

Performance

CRT	2-type monochrome
Horizontal resolution	500 TV lines (at center)
Signal system	Conforming to BTA-S001 and SMPTE274M standards

Supported formats

Effective scanning lines	Format	Horizontal scanning frequency	Vertical scanning frequency
1080	23.98PsF	26.97kHz	47.95Hz
1080	24PsF	27kHz	48Hz
1080	25PsF	28.13kHz	50Hz
1080	29.97PsF	33.72kHz	59.94Hz
1080	30PsF	33.75kHz	60Hz
1080	50i	28.13kHz	50Hz

Effective scanning lines	Format	Horizontal scanning frequency	Vertical scanning frequency
1080	59.94i	33.72kHz	59.94Hz
1080	60i	33.75kHz	60Hz
1035	59.94i	33.72kHz	59.94Hz
1035	60i	33.75kHz	60Hz

Video input	1.0 Vp-p±6 dB, 75-ohms terminated
Indicators	REC/TALLY, BATT, VTR SAVE, ⏱

Accessories

Microphone spacer (diameter 19 mm) (1)
Microphone spacer (diameter 21 mm) (1)
Operation manual (1)

Optional accessories

BKW-401 Viewfinder Rotation Bracket
Fog-proof filter (Part No. 1-547-341-12)
Lens assembly (farsighted) (Part No. A-8262-537-A)
Lens assembly (low magnification) (Part No. A-8262-538-A)
Lens assembly (standard magnification with special compensation for aberrations) (Part No. A-8267-737-A)

10-16. HDVF-700A, HD Electronic Viewfinder

General

Power supply	10.5 to 17.0 V DC (supplied by the camera)
Power consumption	33 W
Operating temperature	0°C to 40°C (32°F to 104°F)
Mass	5.0 kg (11 lb) not including hood
External dimensions:	See below

CRT

CRT	7-type monochrome, 90° deflection
CRT Dimensions	160 × 131 mm (6 3/8 × 5 1/4 in)
Picture size	120 × 90 mm (4 3/4 × 3 5/8 in) (4:3 aspect ratio)

Deflection and high voltage

Brightness	500 cd/m2
Resolution	800 lines at center 600 lines at edges
Geometric distortion	2.0% or less
EHT voltage regulation	within ±2.0%
EHT voltage	12.5 kV (standard)

Input voltages and signal characteristics

Supported formats

Effective scanning lines	Format	Horizontal scanning frequency	Vertical scanning frequency
1080	23.98PsF	26.97kHz	47.95Hz
1080	24PsF	27kHz	48Hz
1080	25PsF	28.13kHz	50Hz
1080	29.97PsF	33.72kHz	59.94Hz
1080	30PsF	33.75kHz	60Hz
1080	50i	28.13kHz	50Hz
1080	59.94i	33.72kHz	59.94Hz
1080	60i	33.75kHz	60Hz

Effective scanning lines	Format	Horizontal scanning frequency	Vertical scanning frequency
1035	59.94i	33.72kHz	59.94Hz
1035	60i	33.75kHz	60Hz

Video input	1.0 Vp-p±6 dB, 75-ohms terminated
Video input	1.0 Vp-p ±6 dB (SMPTE 240M), 75-ohms terminated
DC restoration	Back porch type Back porch level: within 2% of peak (The fluctuation in black level against 10% to 90% fluctuation in APL)
Frequency response	0.1 to 23 MHz (±2 dB) 23 to 27 MHz (±3 dB)
Peaking	0 to 18 dB (17 MHz)
Synchronization	Line pull range: Horizontal, ±500 Hz or more Vertical, –10 Hz or more Line hold range: ±500 Hz or more

Connectors

CAMERA connector	D-sub 25-pin

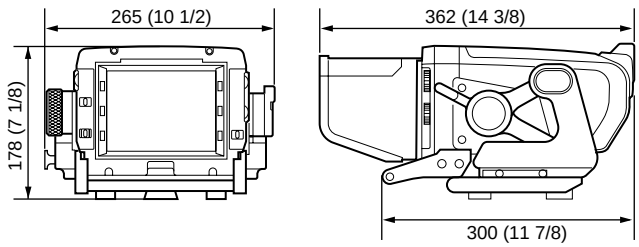
Supplied accessories

Studio monitor hood (1)
Number plate (1)
Fuse (1)
Operation manual (1)

Optional accessories

VFH-770 Outdoor Hood

External dimensions Unit: mm(inches)



10-17. HDVF-C700W/C750W, HD Electronic Viewfinder

General

Power supply	DC10.5 to 17.0V (supplied by the camera)
Power consumption	10W
Operating temperature	0°C to 45°C (32°F to 113°F)
Storage temperature	–20°C to 60°C (–4°F to 140°F)
Mass	HDVF-C750W: 2.0kg(4.4 lb) not including hood HDVF-C700W: 2.2kg(4.9 lb) not including hood
External dimensions:	See below

LCD

LCD	6-type color TFT screen
Image display area dimensions	132 × 74mm (5 1/4 × 3 in) (16:9 aspect ratio)
Tally lamps display area dimensions	132 × 4mm (5 1/4 × 3/16 in, the upper and the lower part)

Performance

Brightness	300cd/m2
Resolution	500 or more lines
Supported formats	

Effective scanning lines	Format	Horizontal scanning frequency	Vertical scanning frequency
1080	23.98PsF	26.97kHz	47.95Hz
1080	24PsF	27kHz	48Hz
1080	25PsF	28.13kHz	50Hz
1080	29.97PsF	33.72kHz	59.94Hz
1080	30PsF	33.75kHz	60Hz
1080	50i	28.13kHz	50Hz

Effective scanning lines	Format	Horizontal scanning frequency	Vertical scanning frequency
1080	59.94i	33.72kHz	59.94Hz
1080	60i	33.75kHz	60Hz
1035	59.94i	33.72kHz	59.94Hz
1035	60i	33.75kHz	60Hz

Color temperature	6500K
Indicators	R TALLY/G TALLY/BATT/ ⏱

Input signals

Pb,Pr:	0.7Vp-p, asynchronous, 75-W terminated
Y :	1.0Vp-p, synchronous, 75-W terminated

Connectors

CAMERA connector
HDVF-C750W: Round type 20-pin
HDVF-C700W: D-sub 25-pin

Supplied accessories

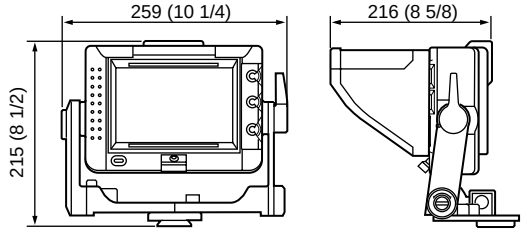
Monitor hood (1)
Number plate (1)
Operation manual (1)
The followings are supplied with the HDVF-C750W only:
- V-shaped shoe attachment (1)
- Hexagonal key (1)
- Hexagonal socket head screws (4)
- Connecting cable (1)

Optional accessories

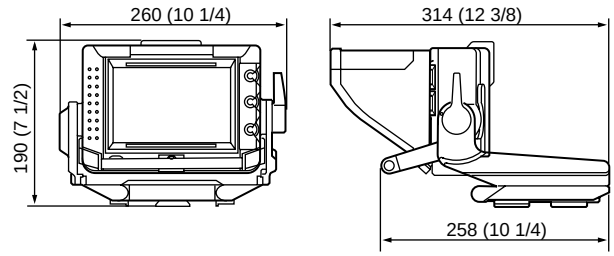
VHF-770 Outdoor Hood

External dimensions Unit: mm(inches)

HDVF-C750W:



HDVF-C700W:



10-18. HKC-T950, HD CCD Block Adaptor

General

Current consumption	13.0 to 17.0 V DC
Operating temperature	–20 °C to +45 °C
Operating humidity	10% to 90% (no condensation)
Mass	Cable adapter: Approx. 0.5 kg (1 lb 2 oz) CCD block adapter: Approx. 0.85 kg (1 lb 14 oz) (adapter only) Approx. 1.65 kg (3 lb 10 oz) (with the CCD block)
Dimensions (W × H × D)	Approx. 108 mm × 230.3 mm × 237 mm (4 3/8 × 9 1/8 × 9 3/8 inches)

CCD block adaptor I/F

Camera cable	CCZ type 26 pin (Male)
MIC IN	XLR-3 (Female)
VIDEO OUT (HD Y)	BNC × 1
LENS	12 Pin
VF	20 Pin
INCOM	XLR-5 (Female)

Cable adaptor I/F

Camera cable	CCZ type 26pin (Female)
MIC OUT	XLR-3 (Male)
VF	20 Pin
INCOM	XLR-5 (Male)

Supplied accessories

HDCZ-A10 cable (10 m) (1), VF relay cable (1), MIC relay cable (1), INCOM relay cable (1), Top cover (1), Operation manual (1)

Optional accessories

HDCZ-A25 (25 m) Part number: 1-823-616-11
HDCZ-A50 (50 m) Part number: 1-523-617-11

10-19. CA-905L, Large Lens Adaptor

General

Mass	12 kg (24 lb 4 oz)
Dimension (w/h/d)	368 × 327 ××534 mm (14 5/8 × 13 × 21 1/8 inches)
Operating temperature range	–20 °C to + 45 °C (–4 °F to +113 °F)
Storage temperature	–20°C to + 55°C (–4°F to +131°F)
Power Consumption	90 W (Large lens and 7-type color viewfinder with the BKP-9057)

Input/Output connectors

CCU connector	LEMO type fiber connector
Lens connector (front)	36-pin
LENS connector (top)	12-pin
CA connector	LEMO type fiber connector
REMOTE connector	8-pin

Supplied accessories

Number plate (2) (side panel)
Number plate (1) (rear panel)
Cable clamp (2)
Operation manual including BKP-9057 (1)
Maintenance manual part 1 (1)
Angle-adjusting plates (2)
Rear-panel sticker (1)

Optional accessories

BVF-77/77CE 7-type monochrome viewfinder
HDVF-700A 7-type monochrome viewfinder
BVF-7700/7700P 7-type color viewfinder
(Only when the CCU-900/900P is used)
HDVF-C750W/C700W 6-type color LCD viewfinder
BVF-55/55CE 5-type monochrome viewfinder



Appendix

Function comparison chart – Paint

Menu	Sub Menu	Control Item	MSU-700A		MSU-750		RCP-750/751		RM-B750	
			Menu	Direct Button	Menu	Direct Button	Menu	Direct Button	Menu	Direct Button
Black		R,G,B,Master	✔		✔		✔	✔	✔	R/B/ Master
		ABB	✔	✔	✔	✔		✔		✔
White		R,G,B	✔		✔		✔	✔	✔	R/B
		AWB	✔	✔	✔	✔		✔		✔
Flare		R,G,B	✔		✔		✔	✔*2	✔	
		Flare Off	✔		✔		✔		✔	
Gamma/Knee		Gamma	✔		✔		✔		✔	
		Blk Gamma	✔		✔		✔		✔	
		Knee Point	✔		✔		✔		✔	
		Knee Slope	✔		✔		✔		✔	
		Gamma Off	✔	✔	✔		✔		✔	
		Black Gamma (on/off)	✔	✔	✔	✔		✔		✔*1
		Knee Off	✔	✔	✔		✔		✔	
		Auto Knee (on/off)	✔	✔	✔	✔		✔		✔*1
V mod Saw		R,G,B, Master	✔		✔				✔	
		V Mod Saw Off	✔		✔				✔	
Detail	Detail 1	Level	✔		✔		✔	✔	✔	
		Limiter	✔		✔		✔		✔	
		Crispening	✔		✔		✔		✔	
		Level Dep	✔		✔		✔		✔	
		Level Dep Off	✔	✔	✔					
		Detail Off	✔	✔	✔		✔		✔	
		SD DTL Off		✔			✔		✔	
	Detail 2	H/V Ratio	✔		✔		✔		✔	
		Frequency	✔		✔		✔		✔	
		Mix Ratio	✔		✔		✔		✔	
		Detail Comb	✔		✔		✔		✔	
		Detail Off	✔	✔	✔		✔		✔	
		SD DTL Off		✔			✔		✔	
	Detail 3	W. Limiter	✔		✔		✔		✔	
		B.Limiter	✔		✔		✔		✔	
		Knee Aperture	✔		✔		✔		✔	
		Knee Aperture(on/off)	✔	✔	✔		✔		✔	
		Detail (on/off)	✔	✔	✔				✔	
Skin Detail	1/2/3 (common)	Level								
		Phase	✔		✔		✔		✔	
		Width	✔		✔		✔		✔	
		Saturation	✔		✔		✔		✔	
		Auto Hue#	✔	✔(1)	✔	✔(1)				
		DTL Gate		✔				✔		
		Gate# (on/off)	✔		✔					
		Skin Dtl#(cach channel) (on/off)	✔		✔		✔		✔	
		SkinDetail (all channels) (on/off)	✔	✔	✔	✔		✔		✔*1
Gamma		R,G,B, Master	✔		✔		✔		✔	
		Gamma 0.40, 0.45, 0.50	✔	✔	✔					
		Gamma Off	✔	✔	✔		✔		✔	
Black Gamma	RGB	R,G,B, Master	✔		✔		✔		✔	
		Low/L Mid/H Mid/High Range	✔		✔					
		Black Gamma (on/off)	✔	✔	✔			✔		✔*1
	Y	Y	✔		✔		✔		✔	
		Low/L Mid/H Mid/High Range	✔		✔					

Menu	Sub Menu	Control Item	MSU-700A		MSU-750		RCP-750/751		RM-B750	
			Menu	Direct Button	Menu	Direct Button	Menu	Direct Button	Menu	Direct Button
		Black Gam(Y) (on/off)	✔		✔		✔		✔	
Gamma Table		Standard	✔		✔		✔		✔	
		User	✔		✔		✔		✔	
		Standard (on/off)	✔		✔		✔		✔	
		User (on/off)	✔		✔		✔		✔	
		Gamma Off					✔		✔	
Knee Point		R,G,B, Master	✔		✔		✔		✔	
		Auto Knee (on/off)	✔	✔	✔	✔		✔		✔*1
		Knee Off	✔	✔	✔		✔		✔	
Knee Slope		R,G,B Master	✔		✔		✔		✔	
		Auto Knee (on/off)	✔	✔	✔	✔		✔		✔*1
		Knee Off	✔	✔	✔		✔		✔	
Knee Saturation		Knee Point	✔		✔		✔		✔	
		Knee Slope	✔		✔		✔		✔	
		Level	✔		✔		✔		✔	
		Auto Knee (on/off)	✔	✔	✔	✔		✔		✔*1
		Knee Off	✔	✔	✔		✔		✔	
		Knee Sat (on/off)	✔	✔	✔		✔		✔	✔*1
White Clip		R,G,B, Master	✔		✔		✔		✔	
		White Clip Off	✔		✔		✔		✔	
Matrix	1	R-G, G-B, B-R	✔		✔		✔		✔	
		Multi Matrix (on/off)	✔		✔					
		User Matrix (on/off)	✔		✔		✔		✔	
		Preset Matrix (on/off)	✔		✔		✔		✔	
		Matrix Off	✔	✔	✔		✔		✔	
	2	R-B, G-R, B-G	✔		✔		✔		✔	
		Multi Matrix (on/off)	✔		✔					
		User Matrix (on/off)	✔		✔		✔		✔	
		Preset Matrix (on/off)	✔		✔		✔		✔	
		Matrix Off	✔	✔	✔		✔		✔	
	Multi	Phase, Hue, Saturation	✔		✔		✔		✔	
		All Clear	✔		✔		✔		✔	
		Multi Matrix (on/off)	✔		✔		✔		✔	
		User Matrix (on/off)	✔		✔					
		Preset Matrix (on/off)	✔		✔					
		Matrix Off	✔	✔	✔		✔		✔	
Low Key Sat		Level	✔		✔		✔		✔	
		Low/L Mid/H Mid/High Range	✔		✔					
		Low Key Sat (on/off)	✔	✔	✔		✔		✔	
Mono Color		Saturaion	✔		✔					
		Hue	✔		✔					
		Mono (on/off)	✔	✔	✔					
Auto Iris		Pattern	✔		✔		✔		✔	
		Auto Iris (on/off)	✔	✔	✔	✔		✔		✔
ECS/S-EVS		Shutter	✔	✔	✔		✔		✔	
		ECS	✔	✔	✔		✔		✔	
		S-EVS	✔		✔		✔		✔	
		Shutter (on/off)	✔	✔	✔		✔		✔	
		ECS (on/off)	✔	✔	✔		✔		✔	
		S-EVS (on/off)	✔		✔		✔		✔	

Note
MSU: V1.20
RCP: V1.01
RM-B750: V1.00
*1 Available w/VTR function SW (selectable when in the ENG Mode in the menu)
*2 Available w/Black knob (selected from the menu)

Function comparison chart – File

Menu	Sub Menu	Control Item	MSU-700A		MSU-750		RCP-750/751		RM-B750	
			Menu	Direct Button	Menu	Direct Button	Menu	Direct Button	Menu	Direct Button
Reference	Ref. Store		✔		✔		✔		✔	
	Ref. Transfer	CAM → CARD	✔		✔		✔(MS)		✔(MS)	
		CARD → CAM	✔		✔		✔(MS)		✔(MS)	
		CARD → CAMs	✔		✔					
		CAM → CAMs	✔		✔					
	Adjusting	(Paint Menu Items)	✔		✔					
Scene File	Scene Transfer	CAM → CARD	✔		✔		✔(MS)		✔(MS)	
		CARD → CAM	✔		✔		✔(MS)		✔(MS)	
		CARD → CAMs	✔		✔					
		CAM → CAMs	✔		✔					
		Delete	✔		✔					
	Adjusting	(Paint Menu Items)	✔		✔					
Lens File	Lens Store		✔		✔					
	Auto White		✔	✔	✔	✔		✔		✔
	Lens Select	Select File	✔		✔					
		Change Name	✔		✔					
	Adjusting	(Lens Adjusting Items)	✔		✔					
OHB File	OHB Store		✔		✔		✔		✔	
	Auto W.Shading		✔		✔					
	Auto B. Shading		✔		✔					
	Auto White		✔	✔	✔	✔		✔		✔
	Auto Black		✔	✔	✔	✔		✔		✔
	Adjusting	Black Shading	✔		✔					
		White Shading	✔		✔					
		Black Set	✔		✔					
		OHB Matrix	✔		✔					

Function comparison chart – Maintenance

Menu	Secondary Menu	Sub Menu	Control Item	MSU-700A		MSU-750		RCP-750/751		RM-B750	
				Menu	Direct Button	Menu	Direct Button	Menu	Direct Button	Menu	Direct Button
Adjusting 1/2	Black Shading	R, G, B	H saw, H Para, V Saw, V Para	✔		✔		✔		✔	
			Auto B. Shading	✔		✔		✔		✔	
			Blk Shd Off					✔		✔	
	White Shading	R, G, B	H saw, H Para, V Saw, V Para	✔		✔		✔		✔	
			Auto W. Shading	✔		✔		✔		✔	
		White	R, G, B	✔		✔					
			AWB	✔	✔	✔	✔		✔		✔
	Black Set	Black Set	R, G, B	✔		✔					
			Gain Bounce (on/off)	✔		✔					
		Black	R, G, B, Master	✔		✔					
			ABB	✔	✔	✔	✔				
	OHB Matrix	1	R-G, G-B, B-R	✔		✔					
			Matrix Off, OHB Matrix Off	✔		✔					
		2	R-B, G-R, B-G	✔		✔					
			Matrix Off, OHB Matrix Off	✔		✔					
		Multi	Phase, Hue, Saturation	✔		✔					
			Matrix Off, OHB Matrix Off, All Clear	✔		✔					
	Phase	H	H Step (usec)	✔		✔		✔		✔	
			H Coarse	✔		✔		✔		✔	
		SC	SC	✔		✔		✔		✔	
	VBS Level	VBS Level 1	Y, Sync, I Black, Q Black	✔		✔					
		VBS Level 2	Chroma, SC Quad, Q Level	✔		✔					
		Y/C Level	Y, R-Y, B-Y	✔		✔					
		Y/C Black	Y, R-Y, B-Y	✔		✔					
	Monitor Output		Skin Gate	✔		✔					
			Mod Level	✔		✔					
			4:3 Marker (on/off)	✔		✔					
			4:3 Mod (on/off)	✔		✔					
Cam SW Setting		Camera Fan Mode		✔		✔					
Auto Setup		Auto White		✔	✔	✔	✔		✔	✔	✔
		Auto Black		✔	✔	✔	✔		✔	✔	✔
		Auto Level		✔	✔	✔	✔		✔	✔	
		Auto Hue	Skin Detail 1, 2, 3	✔	✔(1)	✔	✔(1)			✔	
		Auto W. Shading		✔		✔				✔	
		Auto B. Shading		✔		✔				✔	
Lens Adjusting	Flare		R, G, B	✔		✔					
	V Mod Saw		R,G,B, Master	✔		✔					
			D Shad Comp (on/off)	✔		✔					
			V Mod Saw Off	✔		✔					
	Auto Iris		Pattern	✔		✔		✔		✔	

Menu	Secondary Menu	Sub Menu	Control Item	MSU-700A		MSU-750		RCP-750/751		RM-B750	
				Menu	Direct Button	Menu	Direct Button	Menu	Direct Button	Menu	Direct Button
			Level	✔		✔		✔		✔	
			APL Ratio	✔		✔		✔		✔	
			Iris Gain	✔		✔		✔		✔	
SD Adjusting	Gamma		(HD)M Gamma	✔		✔				✔	
			(HD)Blk Gamma	✔		✔				✔	
			SD M Gamma	✔		✔				✔	
	H Interp		A,B,C,D,E	✔		✔					
	V Interp		A,B,C,D,E	✔		✔					
	Detail	Detail 1	(SD) Level	✔		✔		✔		✔	
			(SD) Limiter	✔		✔		✔		✔	
			(SD) Crispening	✔		✔		✔		✔	
			(SD) Level Depend	✔		✔		✔		✔	
			(HD) Detail Off	✔	✔	✔		✔		✔	
			(SD) Detail off	✔	✔	✔		✔		✔	
		Detail 2	(SD) H/V Ratio	✔		✔		✔		✔	
			(SD) Frequency	✔		✔		✔		✔	
			(HD) Detail Off	✔	✔	✔		✔		✔	
			(SD) Detail off	✔	✔	✔		✔		✔	
		Detail 3	(SD) W.Limiter	✔		✔		✔		✔	
			(SD) B. Limiter	✔		✔		✔		✔	
			(HD) Detail Off	✔	✔	✔		✔		✔	
			(SD) Detail off	✔	✔	✔		✔		✔	
	Crs Col Reduce		Crs Col Reduce (on/off)	✔		✔				✔	
			Coring	✔		✔				✔	
			Level	✔		✔				✔	
			Comb	✔		✔				✔	
	Aspect		Aspect Select	✔		✔					
			16:9 Squeeze	✔		✔					
			Letter Box	✔		✔					
			4:3 Crop	✔		✔					
			Letter size	✔		✔					
			Crop Posi	✔		✔					

Function comparison chart – Configuration

Menu	Secondary Menu	Sub Menu	Control Item	MSU-700A		MSU-750		RCP-750/751		RM-B750	
				Menu	Direct Button	Menu	Direct Button	Menu	Direct Button	Menu	Direct Button
Camera	CAM Mode Set 1/2		White Setup Mode	✔		✔					
			OHB Matrix Correct Mode (on/off)	✔		✔					
	2/2		V Detail Creation Mode	✔		✔					
			V Detail Control Mode	✔		✔					
			Preset Matrix	✔		✔				✔	
			16:9->4:3 Crop On	✔		✔				✔	
CCU	CCU Mode Set 1/2		BARS Character (on/off)	✔		✔					
	2/2		Return Letter Box Mode	✔		✔					
			Gen Lock Mode	✔		✔					
	BARS Char Set		Bars Characters	✔		✔					
	Return Setting		Return 1,2,3,4	✔		✔					
	Multi Format		System	✔		✔					
			Output 1,2,3	✔		✔					
CNU	RCP Assign			✔		✔					
	MSU Assign			✔		✔					
MSU or RCP or RM	Adjusting	Buzzer	Call, Touch, Switch, Master	✔		✔		✔		✔	
			Call Buzzer, Touch Click, Switch Click, All Off	✔		✔		✔		✔	
		LED Bright	Switch, Tally, Other LED, Master	✔		✔		✔		✔	
	Date/Time	Date	Year, Month, Day	✔		✔		✔		✔	
		Time	Hour, Minute, Second	✔		✔		✔		✔	
	Security	Engineer Mode (on/off)		✔		✔				✔	
		Status	*Ref. Enable (on/off)*	✔		✔				✔	
			Lens Enable (on/off)	✔		✔					
			OHB Enable (on/off)	✔		✔				✔	
			Crop Enable (on/off)	✔		✔				✔	
			Full Lock (on/off)	✔		✔					
			View Mode (on/off)	✔		✔					
			Paint Only (on/off)	✔		✔					
		Code Change		✔		✔					
	Information			✔		✔		✔		✔	
MSU	MSU Adjusting	EL Bright	Level	✔		✔					
		LED Disp Bright	Level			✔					
	MSU SW Set 1/2		*PIX/WF Syncro(on/off)*	✔		✔					
			PIX/WF All Mode (on/off)	✔		✔					
			PIX/WF Control Mode	✔		✔					
			Screen Saver	✔		✔					
			TestSW Mode (Saw, 3step, 10step)			✔					
	2/2		*Extended Call Mode*	✔		✔					
			Shutter Angle Mode (on/off)	✔		✔					

Menu	Secondary Menu	Sub Menu	Control Item	MSU-700A		MSU-750		RCP-750/751		RM-B750	
				Menu	Direct Button	Menu	Direct Button	Menu	Direct Button	Menu	Direct Button
RCP	Rotary Encoder Setting	BLACK/ FLARE	Black					✔			
			Flare					✔			
		DETAIL	Detail					✔			
			SD Detail					✔			
LCD	LCD Brightness/ Contrast		Bright					✔		✔	
			Contrast					✔		✔	
Memory Stick	Memory Stick		Format					✔		✔	
RM	Cable Comp		10M, 30M, 50M							✔	
	SW Setting 1/2	Panel Active Mode	Full/Part/Lock							✔	
			Full/Lock							✔	
		Test	Saw/3 Step/10Step							✔	
	2/2	VTR S/S	VTR/CALL							✔	
		Function SW	VTR Ctrl/CAM Ctrl							✔	
		VF Menu	Control Enable							✔	
	VR Setting	White	Absolute, Relative 1/1, Relative 1/2, Relative 1/4							✔	
		BLACK	Absolute, Relative 1/1, Relative 1/2, Relative 1/4							✔	
		Master Black	Absolute, Relative 1/1, Relative 1/2, Relative 1/4							✔	
		Iris	Absolute, >Min, >Max, Relative 1/1, Relative 1/2, Relative 1/4							✔	
WF/PIX			R,G,B, RGB, SEQ, ENC							✔	

Note
Italic: Accessible only when in the ENG Mode

Function comparison chart – Function

Menu	Control Item	MSU-700A		MSU-750		RCP-750/751		RM-B750	
		Menu	Direct Button	Menu	Direct Button	Menu	Direct Button	Menu	Direct Button
Operation	Ctrl	✔	✔	✔		✔		✔	
	ND (1/2/3/4/5)	✔	✔	✔		✔		✔	
	CC (A/B/C/D/E)	✔	✔	✔		✔		✔	
	Shutter (on/off)	✔	✔	✔		✔		✔	
	ECS (on/off)	✔	✔	✔		✔		✔	
	Shutter	✔	✔	✔		✔		✔	
	ECS	✔	✔	✔		✔		✔	
	Gamma	✔	✔	✔		✔		✔	
	Master Gain	✔	✔	✔		✔		✔	
SW 1/2	5600K (on/off)	✔	✔	✔	✔	✔	✔	✔	✔*1
	Auto Knee (on/off)	✔	✔	✔	✔	✔	✔	✔	✔*1
	Skin Detail (on/off)	✔	✔	✔	✔	✔	✔	✔	✔*1
	Detail Gate (on/off)	✔	✔	✔		✔	✔	✔	
	Black Gamma (on/off)	✔	✔	✔		✔	✔	✔	✔*1
	Knee Aperture (on/off)	✔	✔	✔		✔		✔	
	Knee Sat (on/off)	✔	✔	✔		✔		✔	✔*1
	Mono (on/off)	✔	✔	✔		✔		✔	
	S-Skin Knee (on/off)	✔	✔	✔		✔		✔	
	Low Key Sat (on/off)	✔	✔	✔		✔		✔	
2/2	Knee off	✔	✔	✔		✔		✔	
	Gamma Off	✔	✔	✔		✔		✔	
	Detail Off	✔	✔	✔		✔		✔	
	Matrix Off	✔	✔	✔		✔		✔	
	White Clip Off					✔		✔	
	Level Dep Off	✔	✔	✔		✔		✔	
	Chroma Off	✔	✔	✔		✔		✔	
	SD Detail Off	✔	✔	✔		✔		✔	
	SD Matrix Off	✔	✔	✔		✔		✔	
White Select	White Preset							✔	
	Memory A							✔	
	Memory B							✔	

Note

*1 Available w/VTR function SW (selectable when in the ENG Mode in the menu)

Function comparison chart – Multi, Card

Menu	Control Item	MSU-700A		MSU-750		RCP-750/751		RM-B750	
		Menu	Direct Button	Menu	Direct Button	Menu	Direct Button	Menu	Direct Button
Multi-Control Menu									
Master/Slave	Master	✔		✔					
	Slave	✔		✔					
	All Slave	✔		✔					
	All Off	✔		✔					
Character	Character on	✔	✔	✔	✔				
	Default	✔		✔					
	System	✔		✔					
	Auto	✔		✔					
	Diag/One Cam	✔		✔					
	Data/One Cam	✔		✔					
IC Memory Card Menu									
Card Initialize		✔		✔					

Function comparison chart – Button and Knob

Button		MSU-700A	MSU-750	RCP-750/751	RM-B750
All		✔*4	✔*4		
CAM PW		✔*4	✔*4	✔*4	
VF PW		✔*4	✔*4		
Signal output select		✔*4 TEST1/TEST2/ BARS	✔*4 TEST/BARS	✔*4 TEST/BARS	✔*4 TEST/BARS
CLOSE		✔*4	✔*4	✔*4	✔*4
STANDARD		✔*4	✔*4	✔*4	✔*4
AUTO SETUP	SKIN DTL AUTO HUE	✔	✔	✔*4	
	LEVEL	✔	✔	✔*4	
	START/BREAK	✔	✔	✔	
	WHITE	✔	✔	✔*4	✔
	BLACK	✔	✔	✔*4	✔
Camera/CCU function ON/OFF	KNEE off	✔			
	DETAIL off	✔			
	LVL DEP off	✔			
	GAMMA off	✔			
	CHROMA off	✔			
	MATRIX off	✔			
	KNEE APERTURE	✔			
	KNEE SAT	✔			✔*1
	MONO COLOR	✔			
	COLOR CORRECT	✔			
	5600K	✔	✔	✔	✔*1
	AUTO KNEE	✔	✔	✔	✔*1
	SKIN DETAIL	✔	✔	✔	✔*1
	DETAIL GATE	✔		✔	
	SATURATION	✔			
	CONTRAST	✔			
	BLACK GAMMA	✔		✔	✔*1
	CHARACTER	✔	✔	✔*4	
	SD MATRIX off	✔			
	SD DETAIL off	✔			
	LOW KEY SAT	✔			
Scene File Control	SCENE FILES	✔	✔		
	STORE	✔	✔		
PICTURE MONITOR		✔*4	✔*4		
WAVEFORM MONITOR		✔*4	✔*4		
Camera Select	PANEL ACTIVE	✔*4	✔*4		
	PARA	✔*4	✔*4	✔*4	
	EXPAND	✔*4	✔*4		
	MASTER			✔*4	
	SLAVE			✔*4	
Filter control	FILTER CTRL	✔			
	ND	✔			
	CC	✔			
ECS/Shutter select		✔			
Gamma select		✔			
Master gain select		✔			
IRIS/MB ACTIVE		✔*4	✔*4	✔*4	
MASTER BLACK control knob		✔	✔	✔	✔
MASTER BLACK RELATIVE				✔*4	
Iris Control knob		✔*4	✔*4	✔*4	✔*4
CALL		✔*4	✔*4	✔*4	✔*1&*4

Button		MSU-700A	MSU-750	RCP-750/751	RM-B750
Auto Iris		✔	✔	✔	✔
IRIS RELATIVE				✔*4	
SENS control				✔*4	
COARSE control				✔*4	
WHITE knobs				✔	✔(R,B)
BLACK knob				✔ (R,G,B,Master)	✔(R,B,Master)
FLARE knob				✔*2	
PANEL ACTIVE	Full<->Lock			✔*4	✔*4
	Full<->Part<->Lock				✔*4
DETAIL knob				✔	
VTR START/STOP					✔*4
STOP					✔*4
REW					✔*4
PLAY					✔*4
FF					✔*4
REC REVIEW					✔*4
MONITOR					✔*4
FUNCTION (Menu Mode)					✔*4
MAINTENANCE (Menu Mode)					✔*4
SCENE (Menu Mode)					✔*4
PAINT (Menu Mode)					✔*4
VF DISP					✔*3&*4
VF MENU					✔*3&*4
CANCEL					✔*3&*4
ENTER					✔*3&*4

Note

*1 Available w/VTR function SW (selectable when in the ENG Mode in the menu)
*2 Available w/Black knob (selected from the menu)
*3 Available w/Menu Mode buttons by pressing the MONITOR button
*4 Accessible only with switches or knobs on the control panel

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